Technology Administration

Mission Statement

The Technology Administration's mission is to work with U.S. industry to maximize technology's contribution to U.S. economic growth by maintaining and improving key components of the Nation's technological infrastructure; fostering the development, diffusion, and adoption of new technologies and leading business practices; creating a business and policy environment conducive to innovation; and disseminating technical information.

The Technology Administration (TA) works with U.S. industry to maximize technology's contribution to U.S. economic growth. TA develops and disseminates measurement techniques, reference data, test methods, standards, and other types of infrastructural technologies and services required by U.S. industry to compete in the 21st century; fosters the development, diffusion, and adoption of new technologies; disseminates technological information; and promotes a business environment conducive to innovation. Led by the Under Secretary for Technology, TA fulfills its broad responsibilities through three component organizations:

- **The Office of the Under Secretary for Technology,** which provides policy guidance to the Secretary of Commerce and the Technology Administration's component agencies and serves as an advocate for innovation and industrial competitiveness within and outside of government. The Under Secretary coordinates the civilian technology efforts of all Federal agencies and helps to shape Federal civilian R&D priorities based upon the views of industry. The Under Secretary also provides counsel to the Secretary of Commerce on all matters affecting innovation and coordinates with counterparts in the trade and economic agencies to create unified, integrated trade and technology policies. Pursuant to this role, the Under Secretary also oversees the Office of Technology Policy (OTP) and Office of Space Commercialization (OSC).

- **The National Institute of Standards and Technology (NIST),** which works with U.S. industry to address technology needs, delivering broadly useful results shared among companies, industries, and consumers. In addition to its core measurement, testing, and standards functions, NIST also conducts three key extramural programs: the Advanced Technology Program, to stimulate the development of high risk, broad impact technologies by U.S. firms; the Manufacturing Extension Partnership, to help smaller businesses adopt new manufacturing and management technologies; and the Baldrige National Quality Program, to help U.S. business and other organizations improve the performance and quality of their operations by providing clear standards and benchmarks of quality.

- **The National Technical Information Service (NTIS),** which operates a central clearinghouse of scientific and technical information which is useful to American business and industry. NTIS is directed to collect scientific and technical information, catalog, abstract and index the information, permanently archive the information and disseminate products in the forms and formats most useful to its customers; develop electronic and other new methods and media to disseminate information; provide information processing services to other Federal agencies; and charge fees for its products and services that permit NTIS to recover its costs.

Initiatives and Priorities

Department-wide

Accelerating the Transition to Electronic Commerce: Businesses increasingly are using e-commerce for a wide range of critical processes throughout the supply chain, from exchanging product design data to conducting financial

transactions. This trend promises to have a broad economic impact by lowering production costs and raising productivity throughout the economy. Current industry forecasts indicate that business-to-business e-commerce transactions will continue to grow rapidly, and may approach $3 trillion per year by 2003. The continued growth and efficient adoption of these practices requires new infrastructural tools and capabilities. In FY 2001, TA is requesting additional resources to collaborate with the private sector to build new infrastructure for a new economy:

- *E-commerce tools for small businesses (MEP / Electronic Commerce Outreach):* This initiative will provide tools for small businesses to adopt and efficiently use business-to-business e-commerce processes. With fewer information technology resources, small businesses often are at a disadvantage in trying to work with larger companies through business-to-business e-commerce. NIST's Manufacturing Extension Partnership (MEP), in partnership with the Small Business Administration and the Department of Agriculture, will develop an "E-Commerce Jump Start Kit" and other tools to help small business fully participate in e-commerce. MEP's nationwide system of centers and offices will help disseminate the tools to small businesses and provide additional support in adopting electronic business practices.

- *Standards for electronic data exchange (Manufacturing Interoperability) :* Businesses increasingly are using e-commerce to exchange technical data with suppliers, which can substantially decrease manufacturing costs, accelerate time to market, and improve efficiency. However, inadequate standards for exchanging highly-complex data among different software programs impose a significant cost on the economy—the automotive supply chain alone loses $1 billion annually due to this problem. NIST will develop standards and technologies to improve software interoperability for product data exchange and related applications.

- *Wireless e-commerce (Information Technology for the 21st Century):* The core of e-commerce information exchange—networks of wires and optical fiber—currently restrict mobility, accessibility, and the volume of information exchange. Wireless networks represent the future of e-commerce communications, but substantial technical advances are needed to enable widespread adoption of advanced wireless networks. NIST will develop new materials, standards, and other infrastructural technologies that the private sector needs to successfully develop and deploy wireless communications and networking technologies.

Expanding Commerce's Partnerships with Minority Serving Institutions: With the pool of well-trained U.S. technical professionals falling far behind projected needs, the Nation cannot ignore opportunities to enhance the capacity of minority-serving institutions (MSIs). MSIs educate a disproportionately large number of minority scientists and engineers, but because they suffer from a lack of resources to provide top quality training they remain an under-utilized resource. To enhance the capacity of MSIs, NIST will pursue two complementary efforts:

- *Partnering with Minority-Serving Institutions:* NIST will partner with MSIs through grants and cooperative ventures to help build capacity for training minority scientists, engineers, and technicians by improving the training and research experience of MSI faculty, providing research opportunities for undergraduate and graduate MSI students, upgrading MSI research facilities, and working with MSIs on joint technical projects benefiting both NIST and the MSIs.

- *Expanding technical training opportunities at NIST (Postdoctoral Fellowship Program):* NIST will expand its highly successful NIST/National Research Council postdoctoral fellowship—which brings top young scientists and engineers to NIST for advanced research and training—and emphasize partnering with MSIs to identify top candidates. The fellowship program enhances technology transfer between NIST, universities, and industry, and serves as an important tool to recruit new NIST technical staff.

Establishing Safeguards Against Unconventional National Security Threats: The National economy and the Federal government increasingly depend on information technology (IT) infrastructure — the computer systems, networks, software, and embedded processors that help ensure military security, enable financial transactions, control delivery of utility services, permit timely communications, control manufacturing, store and disseminate information, and conduct essentially all economic and government functions. Because this information infrastructure is complex and comprised of highly interconnected systems, even limited attacks or system failures could disrupt large segments of the economy and/or critical government services. NIST will address the crucial problem of critical infrastructure protection (CIP) through three complementary programs that combine public and private sector resources to address current and future national IT security needs. [These programs also respond to the Presidential priority of protecting critical national

infrastructures, as described in Presidential Decision Directive #63 and other communications.]

- *Expert team to identify and help fix Federal IT security vulnerabilities (CIP Expert Review Team):* NIST will establish a team of computer security experts to help Federal agencies identify and fix vulnerabilities in their software, computers, networks, and other information technology resources.

- *NIST information technology security research and development (CIP Research and Development):* NIST will conduct research to develop new security solutions for parts of the public and private sector critical information infrastructure, including advanced cryptography, development of standard security management procedures and practices, and protection of supervisory systems (used to control public utilities, automated building systems, automated manufacturing systems, and other applications).

- *Grants to develop world-leading private sector IT security research and development capacity in the United States (Institute for Information Infrastructure Protection):* NIST will establish the Institute for Information Infrastructure Protection (IIIP) to increase the security, reliability, and survivability of the information technology systems and networks that comprise the nation's information infrastructure. There is a strong need for new research into advanced technologies, tools, measurements, and test methods that can raise the level of reliability and security of critical information technology-based systems and networks. The IIIP will lead a partnership among industry, academia, and government to develop the R&D capacity, technologies, and knowledge needed to protect the Nation's critical information infrastructure.

Addressing Critical Construction and Base Program Needs: In order to continue serving industry adequately, NIST must repair, upgrade, or replace existing facilities. In FY2001, NIST will take the first step toward increasing its base for safety, capacity, maintenance, and major repairs. Planned efforts include a wide range of projects, such as continued upgrades to the fire safety system, removal of hazardous asbestos materials, replacement of compressors or antiquated control systems and electrical switch gear, replacement and repair of selected roofs and roads, improved accessibility for the handicapped, and several urgently needed construction and major renovation projects on NIST's Boulder, Colorado campus.

Effective Program and Service Delivery (Meeting Our Unfunded Mandates): The Office of the Under Secretary for works in partnership with the private sector to develop, coordinate, and advocate national policies that maximize technology's contribution to U.S. economic growth and improve living standards for all Americans. New requests from Congress and the Administration have increased the Under Secretary's responsibilities and call for additional resources in four key areas:

1) the Office of Space Commercialization (OSC) will be expanded to meet new Congressional mandates and Presidential initiatives;
2) the Partnership for the Next Generation Vehicle (PNGV) will develop an economic roadmap identifying actions needed to accelerate commercialization of the PNGV technologies, while minimizing local economic discontinuities as automotive production shifts to advanced automotive technologies;
3) the Office of the Under Secretary will expand the breadth and depth of its reporting on agency technology transfer activities; and
4) the National Medal of Technology program will seek to increase the number of high quality Medal nomination submissions, extend outreach to under-represented communities, and expand media coverage to advance the public's understanding of technology.

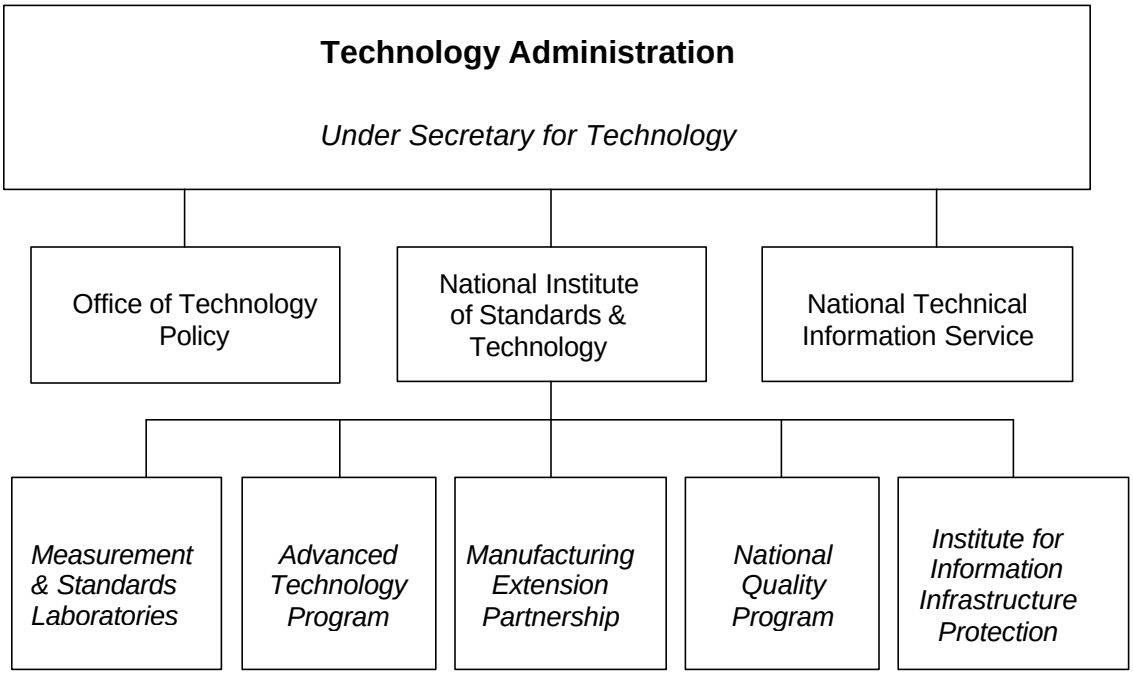
Bureau

Stimulating the Development of Advanced Technology in the Nation (Advanced Technology Program): NIST's Advanced Technology Program (ATP) provides co-funding to the private sector to accelerate the development of high-risk, broadly enabling technologies, thus helping to sustain U.S. global competitiveness. ATP is a rigorously competitive, cost-shared R&D partnership program with companies of all sizes, universities, and other research organizations. While government provides the catalyst, industry conceives, cost-shares, manages, and executes all ATP projects. ATP is in its tenth year of existence, and the evidence shows that the program is working well. The FY 2001 request of approximately $32 million would permit awarding of approximately $65 million in new R&D funding.

Enabling New Science and Technology Breakthroughs at the Atomic Scale (Nanotechnology): Nanotechnology involves understanding and manipulating things at the scale of individual atoms or small groups of atoms. At this tiny scale (on the order of a nanometer or a few billionths of an inch), the properties of materials and devices can be radically different than at "normal" scales or even microscopic sizes. For example, nanotechnology holds the promise of developing materials ten times stronger than steel but ten times lighter by manipulating individual atoms or small groups of atoms, or of building ultra-small robotic devices (too small to be seen by the unaided eye) that could travel through the human body to deliver medicines or find and destroy cancer cells. Nanotechnology will stimulate broad advances in all major economic sectors, including health care, semiconductors, communications, defense, biotechnology, and information technology. NIST is participating with several other Federal agencies in the President's National Nanotechnology Initiative to develop the science and technology to make potential nanotechnology applications a reality. NIST will develop the measurements and standards needed by industry, universities, and government research labs to exploit nanotechnology.

New Super-fast Methods of Materials and Chemical Research (Combinatorial Methods): Combinatorial methods exploit advances in information technology and automation to greatly accelerate research, development, and testing of new materials — from pharmaceuticals to metal alloys to ceramics to complex chemicals to biological products. Through combinatorial methods, scientists can conduct a very large number of experiments in parallel, rather than the traditional sequential method of conducting one experiment, checking the results, and then conducting another experiment with different conditions. Combinatorial methods have been used very successfully in the pharmaceutical industry, but have not yet been broadly adopted in other areas with great potential, including materials science, chemical synthesis, and biotechnology. NIST will develop new measurement techniques and standards to speed the application of combinatorial methods in other fields by industry, universities, and other government agencies.

Organizational Structure



Targets and Performance Summary

Performance Goal 1: Assure and improve measurements and standards			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Qualitative assessment and performance evaluation using a peer review process	N/A	N/A	N/A
Economic impact studies	N/A	N/A	N/A
Standard reference materials (SRMs) available	1,288	1,300	1,315
Standard reference data (SRD) available	60	63	66
Number of items calibrated	3,118	3,200	3,100
Technical publications produced	2,414	2,450	2,450

Performance Goal 2: Stimulate advanced technologies			
Measures	**FY 99 Estimate**	**FY 00 Target**	**FY 01 Target**
Economic impact studies	N/A	N/A	N/A
Cumulative number of technologies under commercialization	120	170	200
Cumulative number of technical publications	480	680	790
Cumulative number of patents filed	640	770	920

Performance Goal 3: Assist small manufacturers			
Measures	**FY 99 Estimate**	**FY 00 Target**	**FY 01 Target**
Increased sales attributed to MEP assistance	$443M	$595M	$748M
Labor and material savings attributed to MEP assistance	$45M	$60M	$76M
Capital investment attributed to MEP assistance	$359M	$483M	$607M
Inventory savings attributed to MEP assistance	$33M	$44M	$56M

Targets and Performance Summary (cont'd)

Performance Goal 4: Promote performance and quality management			
Measures	**FY 99 Estimate**	**FY 00 Target**	**FY 01 Target**
Number of applications per year to the MBNQA and Baldrige-based State and local quality programs	892	916	935
Number of Baldrige *Criteria* mailed by the BNQP and Baldrige-based State and local quality programs	203,700	197,600	193,600

Performance Goal 5: Protect the national information infrastructure			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Activity metrics related to program establishment - such as an operations plan, staffing, oversight and advisory boards	N/A	N/A	Successful establishment

Performance Goal 6: Analyze and develop technology policies			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Number of roundtables, seminars, and negotiations held with industry, government and academia to advance TA policy goals	25	25	25

Performance Goal 7: Collect, organize, preserve, and disseminate government scientific, technical, and business-related information			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Number of items in archive	2,874,416	2,924,416	N/A
Number of documents reproduced from electronic media	721,295	750,000	N/A

Resource Requirements Summary

Total Dollars: $830,148 (thousands)

Goal	FY 99 Actual		FY 00 Enacted		FY 01 Request	
	Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
Assure and improve measurements and standards	$295,020	$119,269	$384,115	$105,416	$368,196	$106,266
Stimulate advanced technologies	$190,343	0	$142,600	0	$175,467	0
Assist small manufacturers	$127,901	$3,509	$104,180	$890	$114,137	0
Promote performance and quality management	$3,877	$2,369	$4,903	$1,600	$5,191	$1,600
Protect the national information infrastructure	N/A	N/A	N/A	N/A	$50,000	0
Analyze and develop technology policies	$10,842	$147	$7,945	$575	$8,716	$575
Collect, preserve, and disseminate government technical, scientific, and business information	$1,084	$32,211	0	$40,000	0	0

Total Bureau FTEs: 3,317 FTE

Goal	FY 99 Actual		FY 00 Enacted		FY 01 Request	
	Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
Assure and improve measurements and standards	2050	712	2041	722	2106	714
Stimulate advanced technologies	271	0	280	0	280	0
Assist small manufacturers	89	20	113	0	114	0
Promote performance and quality management	39	0	40	0	40	0
Protect the national information infrastructure	N/A	N/A	N/A	N/A	12	0
Analyze and develop technology policies	43	1	50	1	50	1
Collect, preserve, and disseminate government technical, scientific, and business information	0	322	0	260	0	0

Resource Requirements Summary (cont'd)

Total Bureau IT Dollars: $61,797 (thousands)

Goal	FY 99 Actual	FY 00 Enacted	FY 01 Request
Assure and improve measurements and standards	$48,004	$49,800	$54,834
Stimulate advanced technologies	$2,814	$3,741	$3,265
Assist small manufacturers	$2,590	$2,761	$2,853
Promote performance and quality management	$490	$561	$635
Protect the national information infrastructure	N/A	N/A	N/A
Analyze and develop technology policies	$176	$181	$210
Collect, preserve, and disseminate government technical, scientific and business information	$9,922	$7,444	0

Performance Goal 1:
Assure and Improve Measurements and Standards

Rationale for Performance Goal

The NIST *Measurement and Standards Laboratories* (MSL) develop and deliver measurement techniques, reference data, test methods, standards, and other types of infrastructural technologies and services that provide a foundation for industry in all stages of commerce: research, development, testing, production, and marketing. NIST laboratories also support U.S. firms in the global marketplace by working to eliminate trade barriers associated with different national standards, testing, and certification requirements.

Since its establishment in 1901 as the National Bureau of Standards, NIST has collaborated closely with industry to anticipate and address the Nation's measurement, standards, and technology needs. NIST's extensive and diverse interactions with industry provide an important source of information about the quality, direction, and future demand for NIST products and services.

NIST evaluates its performance and plans its work in part through direct customer feedback, but also through three distinct evaluation mechanisms: peer review and other forms of external assessments; economic impact studies; and quantitative output tracking. Each of NIST's programs uses a different mix of these three evaluation mechanisms, tailored to each program's distinct goals, outputs, and management needs. Taken alone, no individual measurement mechanism provides a singularly robust and comprehensive source of performance evaluation data. Taken together, however, all three evaluation mechanisms—combined with continual feedback from customers—collectively provide NIST management as well as external stakeholders with a highly detailed, rich and reliable set of performance data encompassing NIST's strategic goals.

Measure 1.a:
Qualitative assessment and performance evaluation using peer review

Since 1959 the NIST Measurement and Standards Laboratories have been reviewed annually by the National Research Council. The current NRC Board on Assessment of NIST Programs is composed of approximately 150 scientists and engineers, organized into seven panels (one for each of the seven NIST laboratories) plus two subpanels for specialized programs. Panel reviews are reported at the Division level (the major organizational unit for the laboratories), and build upon assessments of research processes at the project and program levels.

The NRC Board on Assessment review is independent, technically sophisticated, and extensive. Each panel conducts a two- to three- day on-site review of an individual laboratory's technical quality, with particular attention to the following factors:

- Technical merit of the laboratory programs relative to the state-of-the art.
- The degree to which the laboratory programs conform to their mission.
- The effectiveness with which the laboratory programs are carried out and the results disseminated.
- The adequacy of the laboratory's facilities, equipment, and human resources, insofar as each affects the quality of the technical programs.

Data Validation and Verification:

Data collection: NRC Board on Assessment panels observe and analyze each MSL lab.
Frequency: Annual
Data storage: NRC
Verification: NRC independence and high technical capability; internal NRC quality controls.
Data limitations: Data are inherently qualitative and non-cumulative
Actions to be taken: None available

NRC panel reports for each laboratory become the basis for a comprehensive annual peer review report of the NIST MSL [The most recent NRC report, covering FY 1999, was released in October 1999 and can be viewed at http://www.nap.edu/books/NI000763/html/]. The NRC report provides each laboratory not only with an external quality assessment, but also with a valuable source of information for its own performance assessment, planning, and management functions. For FY 2001, the NRC will again review the MSL, and NIST will seek to obtain similarly strong findings as those provided in FY 1999 (see table below). To complement this peer review information, the

Performance Goal 1: Assure and Improve Measurements and Standards

complement this peer review information, the MSL will continue to compile benchmarking data that compare specific NIST measurement capabilities and practices relative to those of other national metrology institutes (NMIs), measurement laboratories, and industry measurement needs.

Measure 1.b: Economic impact studies

NIST augments the performance data obtained through peer review and benchmarking with formal microeconomic impact assessments of the long-term impacts of specific research projects. These studies provide qualitative assessments and quantitative estimates of the economic impacts resulting from the different types of technology infrastructure that NIST provides to U.S. industry. These impacts include increases in R&D efficiency and manufacturing productivity, enhanced product quality, and lower market transactions costs. Where data allow, quantitative estimates are provided in one of several generally acceptable forms: net present value, benefit-cost ratio, or internal rate of return.

NIST has been conducting economic impact studies on a regular basis since 1992. In addition to demonstrating consistently strong social rates of return and positive benefit/cost ratios, these studies provide NIST management with detailed information that is useful for evaluating current and prospective research projects and for supporting strategic planning processes.

Currently, about five new impact studies are initiated annually, focusing on projects with substantial histories. Because such studies are conducted intermittently and at the project level, they cannot be used to generate cumulative quantitative impact data for annual GPRA reporting. Recent economic impact studies and related information are available at: http://www.nist.gov/director/planning/strategicplanning.htm.

Data Validation and Verification:

Data collection Research is contracted to economic and technical experts, who generate quantitative estimates and qualitative information using performance data gathered through industry surveys and field research. Project cost data are supplied by NIST.
Frequency Intermittent.
Data storage Contractors collect and maintain all data. Survey results, cost data, and all calculations are presented in final reports.
Verification Data are gathered and analyzed by highly qualified economists and technical specialists using well-developed research methods and standard economic and business analysis metrics, as specified and monitored by NIST.
Data limitations Elements of study population s often are too diffuse to measure; availability and quality of industry data often are uneven; impact estimation typically requires counterfactual data, which can be difficult to estimate; outcomes are specific to each project—e.g. results are not cumulative and not readily comparable.
Actions to be taken Data collection is limited temporally and spatially to maximize data reliability.

Performance Goal 1:
Assure and Improve Measurements and Standards

Table: Summary of FY 1999 NRC Peer Review Findings

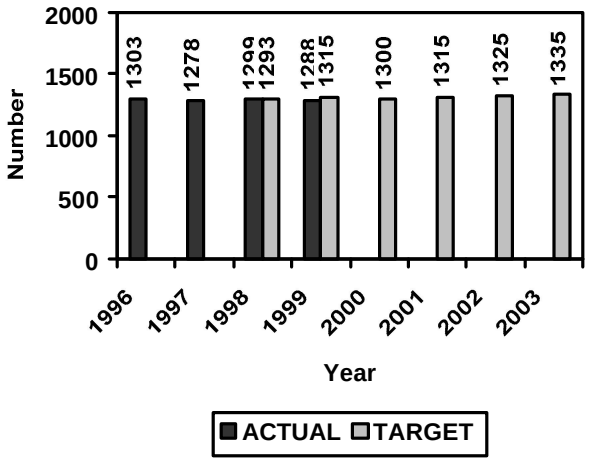
LAB	NRC Summary Finding, FY 1999*
Electronics and Electrical Engineering (EEEL)	..."[T]he technical activities under way in the EEEL are producing important results that have significant impacts on relevant industries. Given that the laboratory's mission to provide measurement capabilities for the U.S. electronics and electrical industries is very broad, EEEL management must make careful decisions about how to best utilize the limited resources available to NIST. The panel applauds the laboratory's historically verified ability to select specific areas for focused activities with carefully targeted impacts."
Manufacturing Engineering (MEL)	"Overall the laboratory continues to make significant technical progress and to contribute substantially to the manufacturing industries. Benchmarking exercises have shown that much of the MEL's work is among the best in the world. Programs and projects being pursued are supportive of both the MEL and the NIST missions, and the laboratory has made good progress in developing criteria for program prioritization. Continued effort will result in even more appropriate criteria and in their application in all MEL divisions."
Chemical Science and Technology (CSTL)	"The technical work of the CSTL provides high-quality chemical measurement capabilities and state-of-the-art basic and applied research in a broad range of technical areas. In conformance with the NIST mission, the laboratory maintains an array of programs that foster development of the essential measurement standards and technologies for both current and future technical needs of U.S. industry. The breadth of scientific research and expertise in CSTL reflects the range of customers that benefit from the laboratory's work-encompassing the newer semiconductor, aerospace, and biotechnology industries as well as the more mature chemical processing, health, and energy-related industries."
Physics (PL)	"The work of the [PL] is a mix of both basic and applied research. The basic research, in particular, calls for assessment against standards of quality rather than numerical objectives. Overall, the panel found the work of the laboratory to be of high technical merit. The staff of the laboratory represent one of the world's finest assemblages of talent in many areas of physics. In many cases, research is at or defines the state of the art in its field. Research programs and projects are generally appropriate to the mission of the laboratory and of NIST."
Materials Science and Engineering (MSEL)	"The panel found the quality of all programs to be very high as well as supportive of the laboratory's mission to stimulate more effective production and use of materials by working with materials suppliers and users to ensure the development and implementation of the measurements and standards infrastructure for materials. As confirmed by recent literature citation index analyses, surveys, and workshops, the advances by the laboratory are held in the highest regard by materials industry and research personnel both in the United States and abroad. This leadership in the characterization and measurement of materials is very important to maintaining U.S. materials industries' strong position in the global marketplace."
Building and Fire Research (BFRL)	"The technical merit of the work performed in the BFRL is very high. The current array of programs supports the laboratory's mission and contributes to the U.S. effort to meet the national construction technology goals for research and development, which include reduced operation, maintenance, and energy costs and increased health and safety. Overall, the laboratory has world-class researchers that exhibit great enthusiasm and dedication."
Information Technology (ITL)	"Overall, the panel found that the technical work under way in the ITL was of high quality and that projects are appropriate and well aligned with the laboratory and division missions. This laboratory services a broad range of customers through three essentially different types of activities: research related to measurements and standards for information technology, collaborations with other NIST laboratories in mathematics, statistics, and computational science, and technical infrastructure support services, such as maintenance of computer hardware and networks on the NIST campus. The ITL works hard to fulfill the diverse demands of its mission and is making progress on appropriately integrating the various components of the laboratory into a coherent whole that can take full advantage of the potential synergies among the wide range of expertise residing within the ITL."

*Summary findings were provided by NRC Board on Assessment of NIST Programs on 8/5/99. The complete FY 1999 review document was published in October, 1999 and can be viewed at: http://www.nap.edu/books/NIooo763/html/

Performance Goal 1:
Assure and Improve Measurements and Standards

In part due to the long time frame and intermittent character of economic impact assessments, NIST also tracks MSL's responses to the Nation's established measurement needs NIST through a series of quantitative metrics that track key product and service outputs, such as standard reference materials (SRMs), reference data, and instrument calibration services. These three output metrics convey useful information to management regarding the production and dissemination of particular NIST products and services. However, these output metrics do not provide information about the quality or impact of particular products and services. Moreover, they do not comprehensively represent the output from NIST laboratories. For instance, the technical expertise needed to generate and deliver these products and services supports effective participation in national and international standards organizations. Through these organizations NIST supports the harmonization of measurement and standards practices, which in turn promotes international trade and domestic economic growth.

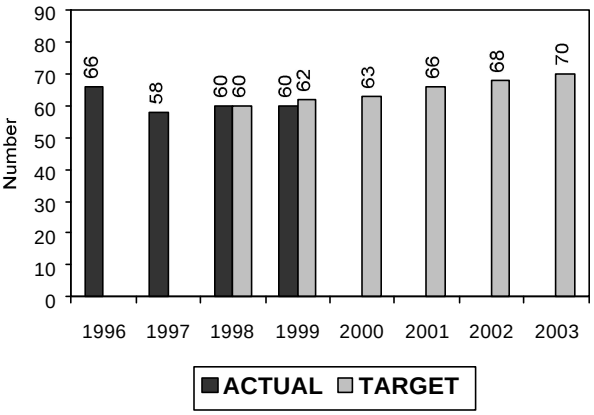
Measure 1.c:
Standard reference materials (SRMs) available



Data Validation and Verification:

Data collection NIST Standard Reference Materials Program.
Frequency Ongoing
Data storage NIST's Standard Reference Materials Program.
Verification Data represent direct and verifiable counts of SRMs produced. Internal verification includes review by NIST Technology Services and NIST Director's Office. Financial data associated with SRM sales are included in NIST's audited financial statements.
Data limitations Data provide information on output levels only; the aggregate quality, composition, and other factors may have a larger bearing on downstream impact than the aggregate level of production.
Actions to be taken There are no obvious replacements for output tabulations due in part to the diverse array of SRMs produced by NIST as well as to the lack of a direct or systematic relationship between volume and impact. Nevertheless, NIST continues to explore alternative metrics that could capture leverage in the secondary market and other factors related to downstream impact.

Measure 1.d:
Standard reference data (SRD) available

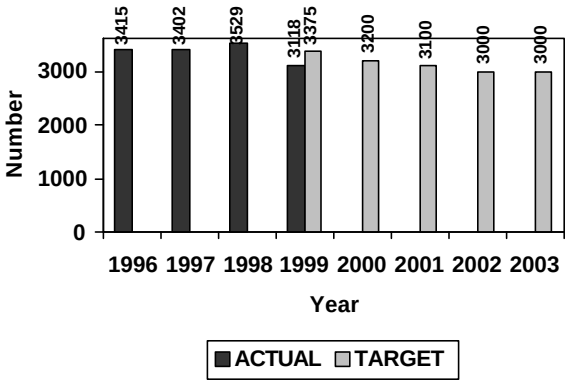


Data Validation and Verification:

Data collection NIST Standard Reference Data Program.
Frequency Ongoing
Data storage NIST's Standard Reference Data Program.
Verification Data represent a direct and verifiable count of SRD products developed and disseminated by NIST. Internal verification includes review by NIST Technology Services and NIST Director's Office. Financial data associated with SRD sales are included in NIST's audited financial statements.
Data Limitations Data provide information on output levels only; factors such as the aggregate composition of databases as well as the mode of access and user interface may have a significant bearing on downstream impact. In addition, output tabulations of data collections do not capture work entailed in updating existing databases.
Actions to be taken There are no obvious replacements for output tabulations due in part to the diverse array of SRD produced by NIST as well as to the lack of a direct or systematic relationship between the number of databases available and impact. Nevertheless, NIST continues to explore alternative metrics that could capture use rates, leverage, and other factors related to downstream impact.

Performance Goal 1:
Assure and Improve Measurements and Standards

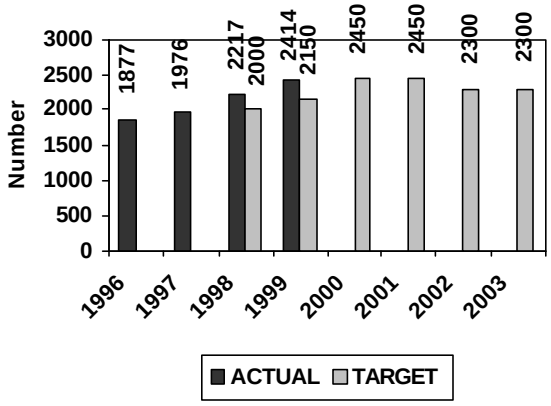
Measure 1.e:
Number of items calibrated



Data Validation and Verification:

Data collection NIST Calibration Services Program.
Frequency Ongoing
Data storage NIST's Calibration Services Program.
Verification Data represent direct and verifiable counts of items calibrated by NIST MSL. Internal verification includes review by NIST Technology Services and NIST Director's Office. Financial data associated with calibration sales are included in NIST's audited financial statements.
Data limitations Data provide information on service output levels only and represent a measure of throughput but not workload per se, as the number of tests and/or time and calibration effort required can vary substantially across items. As with SRMs and SRD, downstream impact is a function of the nature of individual calibration services more than the sheer volume of items calibrated.
Actions to be taken There are no obvious replacements for output tabulations due in part to the diverse array of calibration services produced by NIST as well as to the lack of a direct or systematic relationship between service volume and impact. Nevertheless, NIST continues to explore alternative metrics that could capture leverage in the secondary market and other factors related to downstream impact.

Measure 1.f:
Technical publications produced



Data Validation and Verification:

Data collection NIST Office of Information Services.
Frequency Ongoing
Data storage Publications data are gathered and maintained by NIST Office of Information Services.
Verification Data represent direct and verifiable counts of NIST technical publications that have been cleared for publication by the internal Washington and Boulder Editorial Review Boards. Internal verification includes review by NIST Technology Services and NIST Director's Office.
Data limitations Data are not adjusted for quality and do not capture utility or impact.
Actions to be taken NIST is developing a subcategory measure of publications in peer review journals as a proxy for quality, and is exploring the cost-effectiveness and validity of conducting regular citation tracking as a proxy for breadth of dissemination (partially indicative of impact).

Technical publications are a primary product of NIST's research activities in measurement science and technology. Many of these publications appear in prestigious scientific journals and withstand peer review by the scientific community. Others appear in technological forums where measurement standards and technologies developed by NIST staff (at times in collaboration with private sector partners) are disseminated. NIST uses publications as one of the mechanisms to transfer the results of its work to the U.S. private sector or to other government agencies that need cutting-edge measurements and standards.

Performance Goal 1:
Assure and Improve Measurements and Standards

Program Evaluation Efforts

The programmatic objectives and performance of the Measurement and Standards Laboratories are reviewed regularly by the Visiting Committee on Advanced Technology, a legislatively mandated panel of 15 external advisors that meets quarterly to review NIST's general policy, organization, budget, and programs.

Objectives and Strategies

Objectives	Strategies
Anticipate and address the Nation's most important needs for physical and information-based measurements and standards.	· Work with industry, government, and the scientific community to identify the science and technology required for a robust measurement and standards infrastructure. · Perform laboratory research that develops the measurement tools, data, and models for advanced science and technology.
Strengthen the national system of standards, measurement, measurement traceability, and conformity assessment.	· Promote the efficient delivery of measurement services to meet both current and future infrastructure needs. · Foster the development of domestic voluntary standards needed by government and industry. · Stimulate the development of a robust private conformity assessment system in the United States.
Provide leadership in harmonizing international measurements and standards to facilitate international trade.	· Compare measurement systems and practices with other industrialized countries, to assure consistency and eliminate measurement-related reasons for duplicate testing. · Foster international voluntary standards needed by government and industry. · Collaborate with international standards organizations and counterpart laboratories in researching and developing standards · Use training and consultation to strengthen national metrology systems.

Resource Requirements

Total Dollars: $368.2 million - direct, $106.3 million - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$295.0 M	$119.3 M	$384.1 M	$105.4 M	$368.2 M	$106.3 M

Total FTE: 2,106 - direct, 714 - reimbursable
MSL professional staff consists of 54% Ph.D., 19% MA/MS, 18% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
2050	712	2041	722	2106	714

Performance Goal 1: Assure and Improve Measurements and Standards

Total IT Dollars: $54.8 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$48,004	$49,800	$54,834

Cross-Cutting Issues

Intra-DOC

NIST plays a large role in a wide variety of intra-governmental and government-industry coordination committees. For example, NIST has leadership positions on the committees, subcommittees, and working groups of the National Science and Technology Council (NSTC).

Other Government Agencies

NIST provides research and services in measurement and standards to almost every other agency in the Federal government with scientific missions, contracted through specific Interagency Agreements or Memoranda of Understanding. NIST measurement research, services, and facilities have long contributed to national defense and security, to the nationwide safety and quality-assurance systems that ensure the accuracy of health care measurements, to the accuracy of environmental measurements, and to law enforcement standards.

External Factors and Mitigation Strategies

Industry-specific business conditions and technological developments affect the level and range of demand for NIST products and services over time. For instance, annual demand for calibrations—only one of numerous outputs of the Measurement and Standards Laboratories—can fluctuate due to several factors outside of NIST's control, including changes in the calibration intervals of large customers, changes in the average calibration interval rate in any given year, consolidation of calibration activities within large R&D organizations, and industry consolidation (as, for example, in defense-related industries).

In general, NIST seeks to mitigate the effects of external technological and market uncertainties by maintaining varied and close relationships with its customer base. Through conferences, workshops, technology roadmaps, and many other forms of interaction with its customers, NIST regularly evaluates and adjusts to the direction and level of demand for measurements, standards, reference data, test methods, and related infrastructural technologies and services.

Performance Goal 2: Stimulate Advanced Technologies

Rationale for Performance Goal

Market pressures often deter firms from investing in particular types of technology and R&D projects. For instance, private industry does not account for a large percentage of the Nation's basic R&D, because firms must be able to earn appropriate returns within a time frame and at a level satisfactory to investors. For the same reasons, industry tends to avoid investing or significantly under-invests in certain types of enabling technologies: infrastructural technologies, which require distinct competencies and are broadly applied; multi-use technologies, which benefit multiple segments of an industry or group of industries; and high-potential breakthrough technologies, which typically involve risk levels and time frames that far exceed the horizons of individual firms. In each of these areas, the financial and market interests of individual firms tend to produce a sub-optimal level of investment for the economy and society as a whole. To address this problem, the Advanced Technology Program (ATP) provides industry with the opportunity to invest in and develop innovative technologies that promise significant commercial payoffs and broad benefits for the Nation.

The ATP has developed a sophisticated combination of assessment tools through which it evaluates its impact on the economy. In addition to program guidance provided by the Visiting Committee on Advanced Technology and NIST management, the ATP also evaluates its performance through economic assessments of project developments and long-term impacts, estimates of interim outcomes, status reports on completed projects, and output tabulations.

Measure 2.a: Economic impact studies

The Advanced Technology Program uses a wide range of evaluation mechanisms to assess the long-term impacts associated with ATP-funded projects. Evaluation activities include planning, developing evaluation models and methods, collecting data and constructing databases, and conducting micro- and macro-economic case studies, statistical and econometric analyses, and other forms of assessment and inquiry. Fully successful ATP projects are expected to contribute significantly to the U.S. scientific and technical knowledge base, yield private benefits to the innovators, and, ultimately, yield benefits to others in the Nation—through market, knowledge, and/or network spillovers extending well beyond the direct award recipients. Significant impacts can result from even partial successes. To assess these outcomes, ATP conducts or contracts economic impact studies that seek to quantify private rates of return, social-rates-of-return, and public rates of return (the social-rate-of-return component attributable to the ATP). Evaluation studies address single projects and groups of projects, as well as issues of special concern to policy makers and program management.

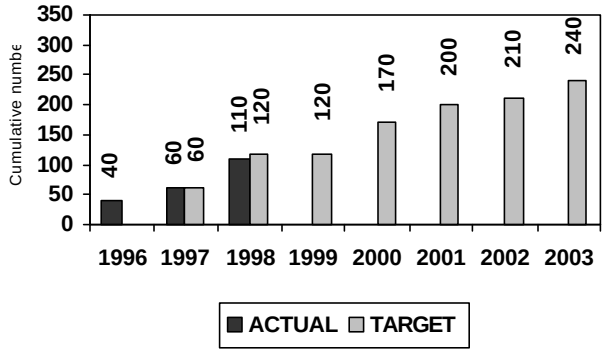
Data Validation and Verification:

Data collection Data collected for ATP's Economic Assessment Office databases (see output metrics section below) are supplemented with data collected by external economic and technical experts, who generate qualitative information and quantitative estimates using data from field research and other public and private databases.
Frequency Intermittent.
Data storage Research methodology and results are presented in final reports; some data are integrated with existing ATP databases.
Verification Data collected and analyzed by contractors, as well as the methodology and results of the data analysis, are rigorously reviewed by NIST economists and technical experts as well as by external experts in evaluation.
Data limitations The time period from ATP funding to economic impacts is long and entails substantial market and technological uncertainties at the point impact studies are undertaken. Few projects are sufficiently mature to assess their impacts; in some cases, projections are used to estimate potential impacts. As with project-level impact assessments in general: results are intermittent and not cumulative; elements of study population s often are too diffuse to measure; availability and quality of industry data often are uneven; impact estimation typically requires counterfactual data, which can be difficult to estimate; outcomes are specific to each project—e.g. results are not cumulative and not readily comparable.
Actions to be taken Studies use the best available estimation techniques and are subject to extensive external and internal review.

To complement its highly focused economic impact studies, ATP also measures and evaluates a wide range of broader output indicators. Below are data for three key output metrics—the number of technologies commercialized as a result of ATP project funding, as well as the number of patents and publications generated by ATP-funded projects.

Performance Goal 2:
Stimulate Advanced Technologies

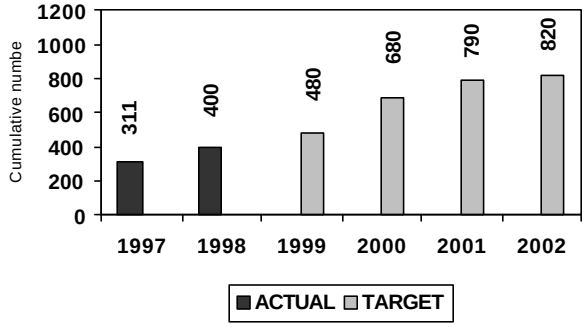
Measure 2.b:
Cumulative number of technologies under commercialization



Data Validation and Verification:

See below.

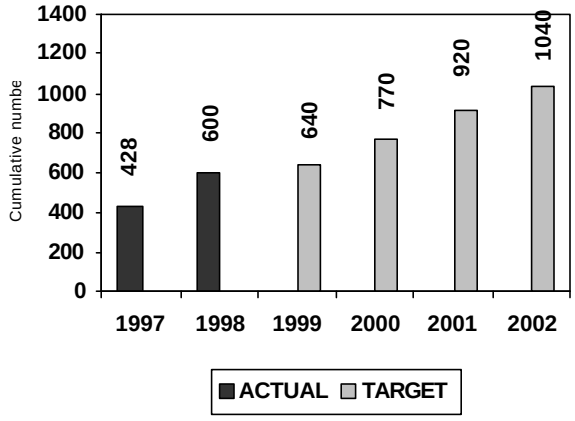
Measure 2.c:
Cumulative number of technical publications



Data Validation and Verification:

See below.

Measure 2.d:
Cumulative number of patents filed



Data Validation and Verification:

See below.

Performance Goal 2: Stimulate Advanced Technologies

Data Validation and Verification::
ATP Technologies Commercialized, Publications, and Patents Filed

Data collection Data are gathered from the portfolio of ATP project participants since 1993 through company filings of patent information to the NIST Grants office (a legal requirement) and an electronic survey instrument under ATP's Business Reporting System (BRS). Separate portfolio-based telephone surveys are conducted of project participants funded prior to 1993 and for post-project data collection.
Frequency Annual over the course of ATP funding for projects funded since 1993; intermittent for projects funded prior to 1993; every two years (up to six years) after ATP funding ends.
Data storage BRS data are maintained by ATP's Office of Economic Assessment in an integrated set of databases covering both descriptive information about the funded organizations and survey responses for all participants in ATP-funded research projects.
Verification ATP's Business Reporting System has been evaluated by external auditors. In addition, all ATP reports using BRS data and patent reports filed through the NIST grants office are monitored closely by ATP for research quality and are subject to extensive NIST-wide review and critique prior to being issued.
Data limitations The BRS electronic survey and other telephone survey instruments represent a standardized reporting system. Standard sources of uncertainty include: variation in interpretation of specific questions; variation in the estimation techniques used in response to specific questions; variation in the quality of industry data; missing values; etc.
Actions to be taken Standard survey techniques already are used to clean the data and assure completeness, accuracy and reliability. Survey response rates already are high—nearly 100 percent for recipients of single-company awards, and 80-90 percent for individual participants in ATP joint ventures.

Program Evaluation Efforts

The programmatic objectives and performance of the Advanced Technology Program are reviewed regularly by the Visiting Committee on Advanced Technology, a legislatively mandated panel of 15 external advisors that meets quarterly to review NIST's general policy, organization, budget, and programs. In addition, the ATP has been subject to a number of external reviews focused on program performance over the course of its 10 year existence. Currently the ATP is the subject of a broad programmatic review by the NRC Board on Science, Technology, and Economic Policy. The first volume of this review, entitled *The Advanced Technology Program: Challenges and Opportunities*, was published in 1999 and is available from the National Academy Press.

In addition to external evaluation, the ATP also conducts internal evaluations to complement the performance information provided for GPRA. For instance, the ATP has begun a series of Status Reports that detail the progress of completed project.[1] In addition, the ATP periodically conducts broad analyses of the data collected through its Business Reporting System, providing a basis for assessing the ATP's progress toward major programmatic objectives (the most recent report found, for instance, that eighty-six percent of ATP-funded organizations are already ahead in their R&D cycle as a result of ATP funding, and acceleration in time-to-market by two years or more is anticipated for 62 percent of planned commercial applications).[2]

To complement its economic analyses, the ATP has established a database to capture quantitative information about the technical progress of ATP-funded projects. This database will help ATP identify and address systemic issues to improve the success of ATP-funded projects, facilitate continuous improvement of ATP's operations, and allow ATP to easily examine and present aggregated information about the status of its portfolio of active and completed projects.

1. See William F. Long, Performance of Completed Projects: Status Report Number 1 *NIST Special Publication 950-1 (March 1999). Available at:*
2. Jeanne W. Powell, Development, Commercialization, and Diffusion of Enabling Technologies: Progress Report for ATP Projects Funded 1993-1995 *(NISTIR 6098; 1997). An update of this report will be available in FY 2000.*

Performance Goal 2: Stimulate Advanced Technologies

Objectives and Strategies

Objectives	Strategies
Encourage industry to increase investment in R&D for high-risk, broad-impact technologies.	· Identify and fund ATP-industry partnerships for the development of emerging, infrastructural, and/or multi-use technologies. · Emphasize cooperative R&D projects. · Expand partnership activities with both the public and private sectors, and strengthen linkages to external sources of innovation-such as small entrepreneurial firms, universities and other sources of basic research, and new research consortia.
Accelerate the commercialization and broad diffusion of ATP-funded technologies.	· Facilitate linkages between ATP award winners and other financial and organizational resources. · Encourage rapid dissemination of information about ATP-funded technologies.

Resource Requirements

Total Dollars: $175.5 million

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$190.3 M	0	$142.6 M	0	$175.5 M	0

Total FTEs: 280
ATP professional staff consists of 49% Ph.D., 33% MA/MS, 16% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
271	0	280	0	280	0

Total IT Dollars:$3.3 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$2.8 M	$3.7 M	$3.3 M

Performance Goal 2: Stimulate Advanced Technologies

Cross-Cutting Issues

Other Government Agencies

The ATP leverages the expertise of scientists and engineers from a wide variety of government agencies and laboratories to participate on the ATP's Source Evaluation Boards. In addition, the ATP Program Managers work with Program Managers from other government agencies to ensure that projects are complementary and relevant—coordination committees in several disciplines have been brought together for this purpose. This also affords an opportunity to examine government R&D from a high level for specific technologies.

External Factors and Mitigation Strategies

ATP has little control over many aspects of the performance measures listed in this document. For instance, the rate at which ATP-funded technologies are commercialized will vary in part due to technological uncertainties intrinsic to the R&D enterprise. In addition, other metrics such as publications and patenting rates will be affected not only by the level of technologies commercialized but also by company-specific strategies and market conditions. For example, patenting is more common in some industries than others, and a variety of factors affect the patenting and/or publishing choices of individual firms. Variation in growth rates and development trajectories add additional uncertainty; some technologies are commercialized rapidly once the research is completed, while others require extensive product development and clinical trials before significant commercialization can occur. There are no practical mitigation strategies for these external sources of uncertainty, other than maintaining robust program management and data collection systems: the ATP insists that its companies abide by the terms and conditions of the cooperative agreement, which include intellectual property and commercialization provisions.

Performance Goal 3: Assist Small Manufacturers

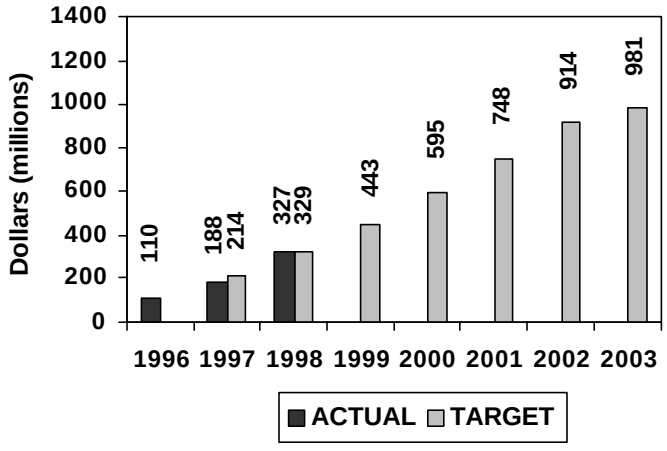
Rationale for Performance Goal

While the United States manufacturing sector as a whole is among the most productive in the world, small manufacturers consistently lag behind their larger counterparts. The Nation's nearly 400,000 small plants and factories employ about 12 million people—nearly two-thirds of all manufacturing jobs—and produce intermediate parts and equipment that contribute substantially to the value of finished products. Due to the pervasive role of small firms in the manufacturing supply chain, the future productivity of the Nation's overall supply base will rest largely on the ability of small firms to improve their quality, raise their efficiency, and lower their costs.

The comparatively low productivity growth of small U.S. firms can be attributed to numerous factors, including technical, cost, and information barriers. Through the Manufacturing Extension Partnership (MEP) Program, NIST helps to overcome these barriers by providing information, decision support, and implementation assistance in adopting new and more advanced manufacturing technologies, techniques, and business practices.

MEP evaluates its performance through a combination of methods including: 1) independent evaluation of MEP program plans and policies by the MEP National Advisory Board; 2) legislatively-mandated independent panel reviews of individual MEP center operations and outcomes conducted against criteria adapted from the Malcolm Baldrige National Quality Award; and 3) regular program oversight and periodic review of individual MEP center operations and outcomes by NIST staff. These reviews and assessments are based on a variety of objective performance metrics, most particularly those relating to impacts on client competitiveness, derived from regular surveys conducted by the Bureau of the Census; and analysis of more detailed information regarding the operations and performance of individual centers. The following four performance measures record the impact of MEP assistance on several key business indicators, which collectively illustrate MEP's impact on key aspects of its clients' competitiveness.

Measure 3.a: Increased sales attributed to MEP assistance

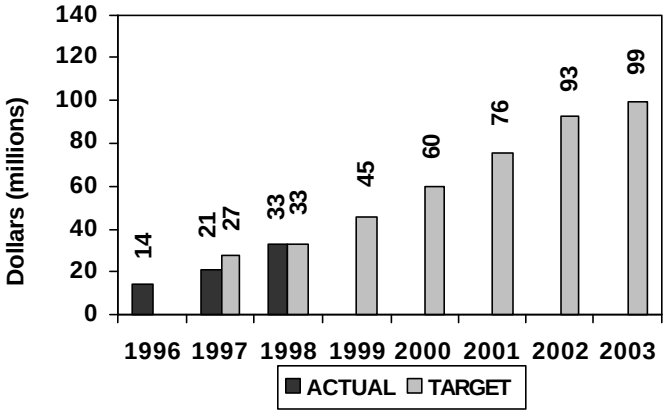


Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

Performance Goal 3: Assist Small Manufacturers

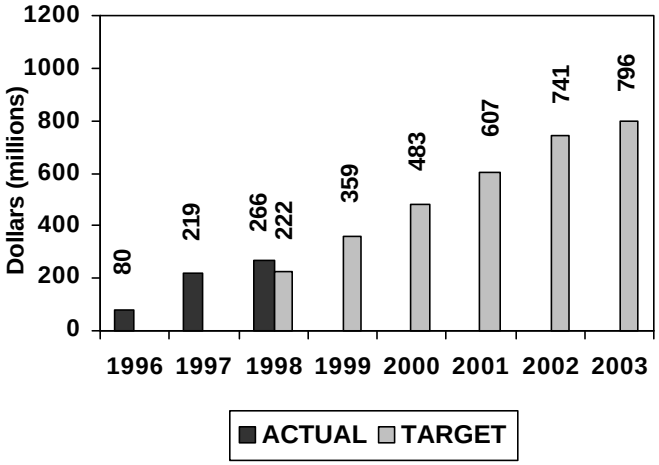
Measure 3.b: Labor and material savings attributed to MEP assistance



Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

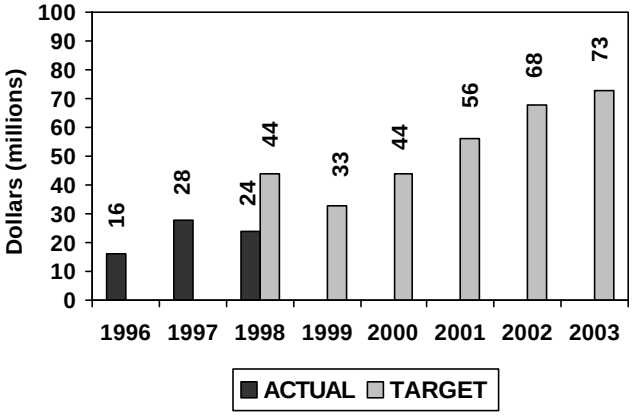
Measure 3.c: Capital investment attributed to MEP assistance



Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

Measure 3.d: Inventory savings attributed to MEP assistance



Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

Performance Goal 3: Assist Small Manufacturers

Data Validation and Verification: MEP Competitiveness Indicators

Data collection To measure the impact of services on clients, MEP centers submit activity data reports to the Bureau of the Census, which uses these reports to plan and conduct surveys of MEP clients. Census compiles the survey data, manages the data to ensure confidentiality, and forwards the data results to MEP.
Frequency Surveys are conducted monthly on a rolling basis, 10 months after project completion; MEP generates and analyzes totals biannually.
Data storage MEP cumulates and stores Census survey data in an Oracle database.
Verification Internal verification includes review by the NIST Director's Office. In addition, DOC IG office audit of MEP's performance measurement system will add external verification (audit begun on 7 November 1999).
Data limitations Measures represent partial impact indicators. Many of the benefits of MEP services are intangible, difficult to quantify, and/or are qualitative in nature. In addition, the time period over which impacts are realized often is different from the 10-month survey period (some impacts take time to become apparent to clients; others extend over longer periods).
Actions to be taken MEP has responded to these problems by limiting impact measurement to 10 month periods (thereby forgoing estimates of cumulative or recurring benefits) and limiting the number of indicators reported to well-defined and quantifiable business indicators (thereby forgoing more comprehensive impact reports).

Program Evaluation Efforts

MEP's National Advisory Board regularly provides external and independent evaluations of MEP's program plans and policies. In terms of organizational processes, evaluation is integral to MEP's operations. MEP evaluates the performance of its centers on an ongoing basis, providing detailed analyses of the operations and performance of individual centers. MEP's evaluation system is described in a recent report to Congress entitled "The NIST Manufacturing Extension Partnership: A Network for Success: A Review of Results and the Evaluation Process" (US Department of Commerce, Technology Administration, NIST, July 1999).

Objectives and Strategies

Objectives	Strategies
Transform a larger percentage of the Nation's small manufacturers into high performance enterprises.	· Provide MEP Centers and clients with access to a wider range of technologies and business practices by generating an integrated knowledge network focused on high performance processes, market dynamics, technological trends, and competitiveness indicators. · Improve each Center's effectiveness and efficiency by improving the level of technical capacity in the field and assisting Centers in developing effective management information systems.

Performance Goal 3: Assist Small Manufacturers

Resource Requirements

Total Dollars: $114.1 million

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$127.9 M	$3.5 M	$104.2 M	$0.9 M	$114.1 M	$0.0 M

Total FTEs: 114
MEP professional staff consists of 11% Ph.D., 74% MA/MS, 11% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
89	20	113	0	114	0

Total IT Dollars: $2.9 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$2.6 M	$2.8 M	$2.9 M

Cross-Cutting Issues

Intra-DOC

MEP assisted DOC's International Trade Administration in making the Self-Help Tool for Y2K analysis, remediation and compliance available to foreign small businesses; in presenting Y2K workshops in Indonesia, Malaysia and Korea; and in distributing foreign language versions of the Tool and CD-ROM both internationally and in the U.S. through the MEP Y2K Help Center.

There have also been meetings between MEP and ITA's U.S. and Foreign Commercial Service concerning collaboration to open global markets to American small and medium-sized manufacturers interested in, but new to, exporting activities.

Other Government Agencies

MEP collaborates with a wide range of agencies, including the Department of Agriculture (with projects serving forestry and food processing industries, promoting sustainable development and providing outreach assistance to clients for implementing a Y2K compliance project); Department of Defense (regional recycling efforts with the Navy); Department of Energy (technology development from DoE labs; Energy, Environment and Manufacturing Assessment Protocol); Environmental Protection Agency (Pollution Prevention; Environmental Best Practices for Metal Finishing and Printing Industries; Environmental Service Provider Networks; Recycling Market Development; Energy, Environment and Manufacturing Assessment Protocol (with DOE); collaborative promotion of sustainable develop-

Performance Goal 3: Assist Small Manufacturers

ment); Department of Health and Human Services (collaboration with the National Institute for Occupational Safety and Health regarding Center health & safety services); Department of Housing and Urban Development (Center workforce development model being adapted to HUD empowerment zones and collaboration on Y2K outreach assistance); Department of Labor (One Stop Career Center; School to Work Project); National Science Foundation (adapting NSF curricula); National Aeronautics and Space Administration (NTTC Technology Mining Project; field agent training); and the Small Business Administration (collaboration in providing outreach assistance to clients for implementing a Y2K compliance project).

External Factors and Mitigation Strategies

The economic and technological environment for small manufacturers in the United States continues to change rapidly. To maximize its effectiveness MEP must not only respond rapidly to its clients' changing needs, but also anticipate changes in the business environment facing small manufacturers. In areas such as e-commerce, where technological developments are revolutionizing the competitive landscape for virtually all small businesses, MEP has been working aggressively to develop solutions to common needs among its client base. However, anticipating and developing solutions to broad business challenges requires a 2-3 year time horizon and commensurate long-term budget and planning commitments.

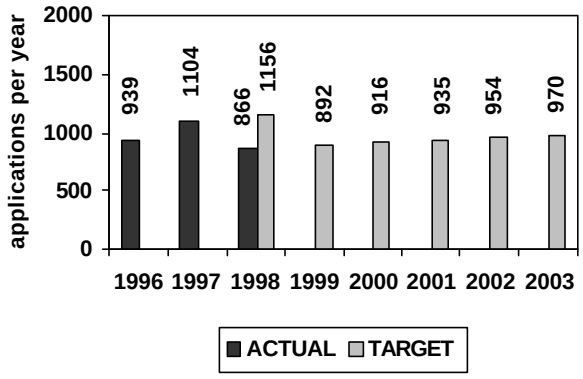
Performance Goal 4:
Promote Performance and Quality Management

Rationale for Performance Goal

As the 21st century unfolds, quality and performance improvement have become requirements—not options—for competitive businesses and high-performance organizations of all types. Through the Malcolm Baldrige National Quality Program (BNQP), NIST provides a systematic and well-tested set of business values, performance criteria, and assessment methods that all organizations can adopt to improve their productivity and effectiveness. Overall, the BNQP catalyzes the business community to define what organizations must do to improve their performance and attain (or retain) market leadership, and it provides a mechanism for broadly disseminating that information.

The Baldrige National Quality Program evaluates its performance through a combination of methods including: 1) independent expert review of all aspects of the BNQP's plans and operations by its Board of Overseers, combined with other annual reviews provided by the Panel of Judges and the Foundation for the Malcolm Baldrige National Quality Award (MBNQA); 2) output tabulations, such as the number BNQP *Criteria for Performance Excellence* distributed by mail; and 3) periodic surveys and other assessments of the program's relevance to corporate performance. In FY 2000, the BNQP expects to complete a formal economic impact assessment to evaluate the Program's longer-term economic impact on corporate performance management practices, profitability, and other business factors.

Measure 4.a:
Number of applications per year to the MBNQA and Baldridge-based state and local quality programs

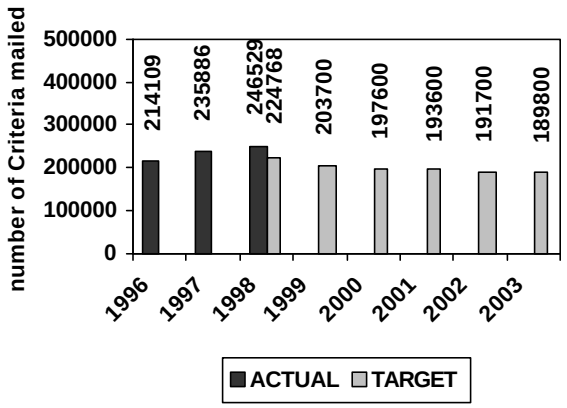


Data Validation and Verification:

Data collection Application data are collected and tracked by the Baldrige National Quality Program.
Frequency Based on the application cycle. Data from State and local programs is collected annually.
Data storage Baldrige National Quality Program.
Verification Data represent direct and verifiable counts of BNQP business activities and processes. Internal verification includes review by the Director's Office.
Data limitations The data are partial representation of BNQP's output. The application count does not capture the large number of organizations that use Baldrige criteria internally but do not formally apply for MBNQA or other Baldrige-based awards. Data from State and local programs is uneven and difficult to collect, resulting in significant time lags. Even with time lags, however, the available data provide a rough proxy for the leveraging effect of the MBNQA on State-level programs.
Actions to be taken BNQP uses other methods to assess the program's relevance and utility, such as occasional executive surveys and review of anecdotal evidence. Timeliness of data generated by State and local quality programs is difficult to influence.

Performance Goal 4:
Promote Performance and Quality Management

Measure 4.b:
Number of Baldridge Criteria mailed by the BNQP and Baldridge-based State and local quality programs



Data Validation and Verification:

Data collection Application data are collected and tracked by the Baldrige National Quality Program.
Frequency Based on the application cycle. Data from State and local programs is collected annually.
Data storage Baldrige National Quality Program.
Verification Data represent direct and verifiable counts of BNQP information dissemination. Internal verification includes review by the Director's Office.
Data limitations The data are partial representation of BNQP's output. The number of documents mailed does not capture additional dissemination channels, such as electronic acquisition and dissemination; reproduction of the Baldrige *Criteria* in textbooks, articles, and other documents; and secondary modes of copying and distribution. Moreover, direct counts of BNQP *Criteria* do not capture various formal and informal ways in which BNQP concepts can be disseminated, such as through academic programs, consulting channels, business and organizational management literature, etc. Data from State and local programs is uneven and difficult to collect, resulting in significant time lags. Even with time lags, however, the available data provide a rough proxy for the leveraging effect of the MBNQA on State and local programs.
Actions to be taken: BNQP uses other methods to assess the program's relevance and utility, such as occasional executive surveys and review of anecdotal evidence. Timeliness of data generated by State quality programs is difficult to influence.

Program Evaluation Efforts

Independent expert review of all aspects of the BNQP's plans and operations is provided by the Board of Overseers, a prestigious group of national quality experts from business and academia. The Board of Overseers serves as a Federal advisory panel to the Secretary of Commerce, and it is the Board's responsibility is to assess how well the BNQP is serving the national interest. The Board reviews all aspects of the BNQP, including the adequacy of the Evaluation Criteria and processes for making Baldrige Awards, and reports its recommendations to the Secretary.

Other annual external program evaluations are provided by the Panel of Judges and the Foundation for the Malcolm Baldrige National Quality Award. Moreover, the House Committee on Science, Space and Technology conducts occasional oversight hearings involving winners of the award, NIST, and outside experts to review the Program's effectiveness and management issues.

Performance Goal 4:
Promote Performance and Quality Management

Objectives and Strategies

Objectives	Strategies
Develop and continuously improve the Malcolm Baldridge National Quality Award, broadly disseminate criteria for evaluating performance, and promote quality awareness and performance excellence.	· Successfully implement the new award programs for the education and health care sectors, and explore the possibility of an award category for other non-profit organizations. · Prepare educational materials (such as case studies) and acquire the capacity to conduct research and generate documents that will: 1) identify best practices and articulate the underlying principles of leading management practices and performance evaluation techniques; and/or 2) help businesses and other organizations initiate and sustain performance improvement strategies.
Promote quality awareness and business excellence practices of small service businesses and manufacturers.	· Use flexible partnerships to reach and address the needs of smaller firms. · Lead an expanding national system of state and local quality programs. · Prepare educational materials designed to help businesses and other organizations initiate and sustain performance improvement strategies.

Resource Requirements

Total Dollars: $5.2 million - direct, $1.6 million - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$3.9 M	$2.4 M	$4.9 M	$1.6 M	$5.2 M	$1.6 M

Total FTEs: 40
BNQP professional staff consists of 13% Ph.D., 50% MA/MS, 25% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
39	0	40	0	40	0

Total IT Budget: $0.6 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$0.5 M	$0.6 M	$0.6 M

Performance Goal 4:
Promote Performance and Quality Management

Cross-Cutting Issues

Other Government Agencies

The BNQP provides OPM with Baldrige Criteria, Processes, and Baldrige Examiner Board members for the Presidential Quality Award.

External Factors and Mitigation Strategies

BNQP's ability to further promote quality awareness and performance excellence will depend in part upon acquiring the formal authority to conduct research, develop data on best practices, and generate self-assessment primers and other educational materials.

Performance Goal 5: Protect the National Information Infrastructure

Rationale for Performance Goal

The ubiquitous and interconnected nature of IT increases the extent to which even limited attacks or failures can broadly disrupt the Nation's information infrastructure. The U.S. economy and society now depend broadly upon computers and networks, and the reliability, security, and quality of those systems must be strengthened. The potential negative consequences of inadequate assurance accumulate as IT systems expand and often are not apparent until major systems fail. Without adequate assurance, the viability of the entire information infrastructure—and therefore the entire U.S. economy—is put at risk.

The goal of this program is to increase the security, reliability, and survivability of the information technology systems and networks that comprise the Nation's information infrastructure. This goal will be pursued through the establishment and operation of the Institute for Information Infrastructure Protection (IIIP), headquartered at NIST, which will lead a partnership among industry, academia, and government to develop the R&D capacity, technologies, and knowledge needed to protect the Nation's critical information infrastructure. Vulnerabilities affecting the information and communications infrastructure can potentially affect the entire U.S. economy, not just a single sector or industry. Consequently, there is a substantial need for significant new research into advanced technologies, measurements, and methods that can raise the level of reliability and security of critical information technology-based systems and networks. The IIIP will build this R&D capacity by providing research grants to universities, industry and government to build appropriate R&D expertise. This work supports Presidential Decision Directive (PDD) #63, dated May 22, 1998, as well as the DoC Secretarial priority on Establishing Safeguards Against Unconventional National Security Threats.

Measure 5.a: Activity metrics related to program establishment

Evaluating the IIIP's performance ultimately will require the development of outcome measures that gauge the security, reliability, quality, and survivability of information technology systems and networks. Appropriate measures would indicate the degree to which technologies generated and disseminated through the IIIP have reduced IT system malfunctions and/or enhanced the reliability of service delivery, the security of information storage and transfer, and the quality of service content. Comprehensive outcome measures of this nature likely will be difficult to develop, and undoubtedly will apply only after the IIIP has been in operation long enough for its R&D outputs to generate measurable aggregate impacts. As the IIIP becomes established, it will build appropriate outcome measures into its long-term program and operational plans.

Data Validation and Verification:

Data collection TBD.
Frequency TBD.
Data storage TBD.
Verification TBD.
Data limitations. TBD.
Actions to be taken. The IIIP will build output and ultimately outcome evaluation into its program plans and operations. The IIIP's Advisory and Oversight committees will be used to provide guidance toward long-term programmatic goals.

In the formative stages of the IIIP, the program will be evaluated through the timely and successful completion of appropriate activities, such as developing an operations plan, hiring staff, establishing advisory and oversight committees, establishing grant selection boards, and providing grant services. In later phases, the program will be evaluated through the production of core R&D outputs that support the Nation's critical information infrastructure: advanced technologies and solutions, tools, standards, and tests. In addition, the Institute's central objective—increasing the Nation's R&D capacity for information infrastructure protection—will be gauged through the provision of R&D grants and the coordination of industry, university, and academic efforts. The IIIP's Oversight Committee will likely provide the best source of information on progress toward this particular objective.

Performance Goal 5:
Protect the National Information Infrastructure

Program Evaluation Efforts

N/A

Objectives and Strategies

Objectives	Strategies
Increase the Nation's R&D capacity for information infrastructure protection.	- Provide research grants to universities, industry, and government to build appropriate R&D expertise

Resource Requirements

Total Dollars: $50.0 million

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
N/A	N/A	N/A	N/A	$50.0 M	0

Total FTEs: 12

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
N/A	N/A	N/A	N/A	12	0

Total IT Budget: TBD

FY 99 Actual	FY 00 Enacted	FY 01 Request
N/A	N/A	TBD

Performance Goal 5: Protect the National Information Infrastructure

Cross-Cutting Issues

N/A

External Factors and Mitigation Strategies

Three major external factors are most likely to affect the IIIP's progress toward its programmatic goals: 1) the technical uncertainty that is intrinsic to the R&D enterprise; 2) the scope of the technologies involved and the pace of technological change; and 3) the dynamics of evolving domestic and international markets. There are no real mitigating strategies for the first factor, other than supporting R&D by the best available people and organizations. To mitigate the effects of the second and third factors, the IIIP will rely on the breadth and technical expertise of a Critical Infrastructure Protection Advisory Committee. The Advisory Committee will comprise up to 35 representatives from the information technology industry, government (e.g., CIP lead sector agencies, Critical Information Assurance Office, and special function coordinators), academia, and private sector owners/operators of critical infrastructure systems (e.g., through Information Sharing and Analysis Centers and other industry alliances). In addition, an Oversight Committee, comprising DoD, GSA, FBI, DoJ, NIST, NSA, DARPA, OSTP, NSC, OMB and other appropriate Federal organizations, will be used to set the IIIP's long term strategic direction.

Performance Goal 6:
Analyze and Develop Technology Policies

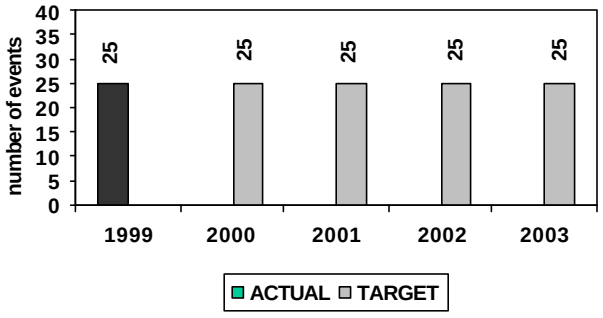
Rationale for Performance Goal

Technological innovation and industrial competitiveness depend upon a supportive policy environment to overcome market inefficiencies in innovation, investment, and competition. To this end, US/OTP coordinates and leads several Presidential Initiatives designed to recognize and promote technological achievement (the National Medal of Technology), generate new technologies with high potential for socio-economic advancements (Partnership for a New Generation of Vehicles-PNGV), and improve the conditions for international technology cooperation (U.S.-Israel Science and Technology Commission-USISTC). In addition, US/OTP works closely with the States to manage and improve complex policies that affect innovation, such as regulatory policies that influence innovation in telemedicine, environmental technologies, building and construction, and other areas.

More generally, US/OTP promotes science and technology policy development and advocacy through analyses of competition in technology-oriented industries; the impact of various regulatory, tax, legal, and other public policies on corporate behavior; and the foreign policy and competitive context in overseas markets. In all of its activities, US/OTP seeks to coordinate Federal and State policy efforts in ways that support a truly national approach to science and technology policy.

US/OTP evaluates its performance and plans its work through several evaluation mechanisms: extensive and ongoing consultation with public and private sector stakeholders, selected peer review, and output tracking. These sources of performance evaluation provide diverse and useful information for managing US/OTP's policy development, coordination, and analysis roles. However, no single output measure can capture US/OTP's diverse activities. Moreover, US/OTP's core functions—providing policy advice and influencing the policymaking process—are difficult to characterize quantitatively. Policy analyses and advocacy efforts seek to influence the attitudes and positions of key parties, while actual policy outcomes are determined by multiple institutional, organizational, economic and political factors. For this reason, US/OTP uses activity and output metrics to characterize the program's overall annual performance, such as the number of roundtables, seminars, negotiations and other meetings held with industry, government and academia to advance TA policy goals

Measure 6.a:
Number of roundtables, seminars, negotiations and other meetings held with industry, government and academia to advance TA policy goals



Data Validation and Verification:

Data collection US/OTP.
Frequency US/OTP performance data cumulate throughout the year and are reported annually.
Data storage US/OTP.
Verification Data represent verifiable tabulations of US/OTP activities.
Data limitations. Data represent a partial indicator of US/OTP work, as described above.
Actions to be taken Tabulations and descriptions of additional program activities can be provided.

Performance Goal 6: Analyze and Develop Technology Policies

Program Evaluation Efforts

US/OTP has not conducted a formal program evaluation in FY 1999, in light of two facts: the intrinsic difficulty of measuring the efficacy of policy advisory functions; and the high cost of formal program evaluation relative to US/OTP's size.

Objectives and Strategies

Objectives	Strategies
Coordinate and lead key interagency technology programs.	-- Recognize and promote technological achievement (the National Medal of Technology). -- Generate new technologies with high potential for socio-economic advancements (PNGV). -- Improve the conditions for international technology cooperation (USISTC).
Coordinate and lead interagency efforts to strengthen technology partnerships between States and the Federal government.	-- Develop and coordinate the U.S. Innovation Partnership to improve how state and federal R&D agencies manage complex policies that affect innovation, such as regulatory policies that influence innovation in telemedicine, environmental technologies, building and construction, and other areas. -- Develop and administer the EPSCoT program to improve the infrastructure and general business conditions for technology-led economic growth in particular regions of the United States.
Improve the information base for science and technology policy.	-- Generate reports and analyses of foreign technology policies and domestic industrial and technological trends, including but not limited to: competition in technology-oriented industries; the impact of various regulatory, tax, legal, and other public policies on corporate behavior; and the foreign policy and competitive context in overseas markets.

Resource Requirements

Total Dollars: $8.7 million - direct, $0.6 million - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$10.8 M	$0.1 M	$7.9 M	$0.6 M	$8.7 M	$0.6 M

Performance Goal 6:
Analyze and Develop Technology Policies

Resource Requirements, cont..

Total FTEs: 50 - direct, 1 - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
43	1	50	1	50	1

Total IT Dollars: $0.2 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$0.2 M	$0.2 M	$0.2 M

Cross-Cutting Issues

Other Government Agencies

Through the Committee on Technology of the President's National Science and Technology Council, the Under Secretary helps to establish clear national goals for Federal science and technology investments and to ensure that Federal civilian R&D priorities reflect the requirements of industry customers. The Committee currently is coordinating several major Administration R&D initiatives in materials, construction and building, manufacturing infrastructure, electronics and automotive technologies.

External Factors and Mitigation Strategies

Outputs associated with coordination and leadership functions depend in part upon the interest and commitment of numerous public and private sector participants operating at the State and Federal levels. US/OTP can influence but not control other participants.

Performance Goal 7:
Collect, organize, preserve, and disseminate government scientific, technical, and business-related information

Rationale for Performance Goal

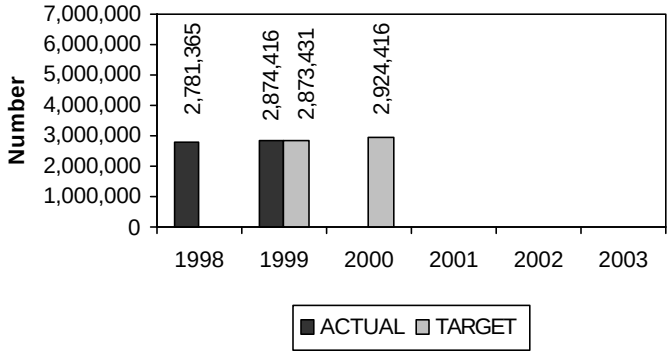
The National Technical Information Service (NTIS) operates a central clearinghouse of scientific and technical information which is useful to American business and industry. NTIS is directed to collect scientific and technical information; catalog, abstract and index the information, permanently archive the information and disseminate products in the forms and formats most useful to its customers; develop electronic and other new methods and media to disseminate information; provide information processing services to other Federal agencies; and charge fees for its products and services that permit NTIS to recover its costs.

NTIS contributes directly to the Department's effort to provide U.S. industry and the Nation with a world-class scientific and technical information base. NTIS' output directly enhances the Nation's scientific and technical information base, which in turn supports virtually all segments of the Nation's scientific and technological enterprise.

NTIS collects its information material primarily from U.S. Government agencies and their contractors and grantees, as well as from international, primarily governmental, sources. The NTIS collection includes almost 3 million titles – reports describing the results of Federally sponsored research; statistical and business information; audiovisual products; computer software and electronic databases developed by Federal agencies; and reports prepared by foreign research organizations. NTIS maintains a permanent repository of its information products and offers copies of this material to its many customers, largely researchers and business managers in private industry. The disseminated materials may include computer downloads or paper, microfiche, audiovisual or electronic media.

Overall, dissemination metrics adequately convey NTIS' performance relative to its statutory responsibilities. However, they do not comprehensively represent NTIS' output and performance (for instance, NTIS also assists agencies in the production and dissemination of their information). Moreover, these measures do not convey the impact of all of NTIS' services.

Measure 7.a:
Number of items in archive

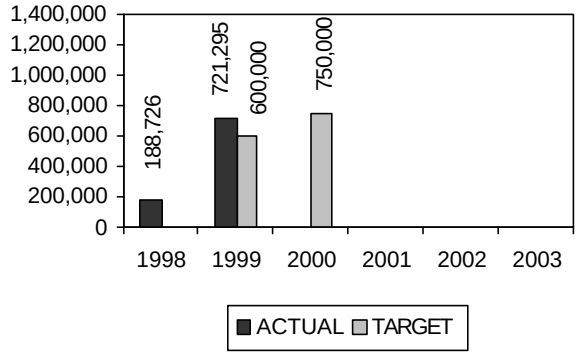


Data Validation and Verification:

Data collection NTIS operates and maintains internal systems for processing collected information into available products. NTIS records every transaction using a commercial order processing system modified to meet its specific needs.
Frequency Internal management activity reports are produced daily, with monthly summaries..
Data storage All performance-related information is stored within the NTIS order processing system.
Verification NTIS accounting and budget offices analyze and report performance output data and revenue and cost data to management. Data verification is provided through regular internal and independent auditor reporting.
Data limitations Data represent only a partial measure of NTIS outputs. Data do not capture quality or impact of NTIS services
Actions to be taken None warranted.

Performance Goal 7:
Collect, organize, preserve, and disseminate government scientific, technical, and business-related information

Measure 7.b:
Number of documents reproduced from electronic media



Data Validation and Verification:

See section above regarding the number of items in the archive.

Program Evaluation Efforts

Legislation has been proposed to Congress that would cease operations of the National Technical Information Service by the end of FY 2000 and would transfer the NTIS collection of scientific and technical information to the Library of Congress, effective October 1, 2000.

Objectives and Strategies

Objectives	Strategies
Play a leadership role in assisting Federal agencies with dissemination of their scientific, technical, and business information.	-Leverage NTIS experience with information dissemination . -Leverage NTIS joint venture authority to broaden distribution.
Provide services and infrastructure to control scientific, technical, and business-related information, and increase the effectiveness of systems for locating and delivering information in the form required by customers.	- Leverage NTIS investment in production technologies. - Leverage NTIS core capabilities for information management. - Leverage NTIS sales and distributor channels. - Develop information products and services for agencies.

Performance Goal 7:
Collect, organize, preserve, and disseminate government scientific, technical, and business-related information

Resource Requirements

Total Dollars: $0.0

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$1.1 M	$32.2 M	$0.0 M	$40.0 M	0	0

Total FTEs: 0

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
0	322	0	260	0	0

Total IT Budget: $0.0 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
N/A	N/A	0

Cross-Cutting Issues

NTIS provides a variety of services that assist other agencies in developing, producing, and disseminating their information.

External Factors and Mitigation Strategies

Legislation has been proposed to Congress that would cease operations of the National Technical Information Service by the end of FY 2000 and would transfer the NTIS collection of scientific and technical information to the Library of Congress, effective October 1, 2000.

Technology Administration

Mission Statement

The Technology Administration's mission is to work with U.S. industry to maximize technology's contribution to U.S. economic growth by maintaining and improving key components of the Nation's technological infrastructure; fostering the development, diffusion, and adoption of new technologies and leading business practices; creating a business and policy environment conducive to innovation; and disseminating technical information.

The Technology Administration (TA) works with U.S. industry to maximize technology's contribution to U.S. economic growth. TA develops and disseminates measurement techniques, reference data, test methods, standards, and other types of infrastructural technologies and services required by U.S. industry to compete in the 21st century; fosters the development, diffusion, and adoption of new technologies; disseminates technological information; and promotes a business environment conducive to innovation. Led by the Under Secretary for Technology, TA fulfills its broad responsibilities through three component organizations:

- **The Office of the Under Secretary for Technology,** which provides policy guidance to the Secretary of Commerce and the Technology Administration's component agencies and serves as an advocate for innovation and industrial competitiveness within and outside of government. The Under Secretary coordinates the civilian technology efforts of all Federal agencies and helps to shape Federal civilian R&D priorities based upon the views of industry. The Under Secretary also provides counsel to the Secretary of Commerce on all matters affecting innovation and coordinates with counterparts in the trade and economic agencies to create unified, integrated trade and technology policies. Pursuant to this role, the Under Secretary also oversees the Office of Technology Policy (OTP) and Office of Space Commercialization (OSC).

- **The National Institute of Standards and Technology (NIST),** which works with U.S. industry to address technology needs, delivering broadly useful results shared among companies, industries, and consumers. In addition to its core measurement, testing, and standards functions, NIST also conducts three key extramural programs: the Advanced Technology Program, to stimulate the development of high risk, broad impact technologies by U.S. firms; the Manufacturing Extension Partnership, to help smaller businesses adopt new manufacturing and management technologies; and the Baldrige National Quality Program, to help U.S. business and other organizations improve the performance and quality of their operations by providing clear standards and benchmarks of quality.

- **The National Technical Information Service (NTIS),** which operates a central clearinghouse of scientific and technical information which is useful to American business and industry. NTIS is directed to collect scientific and technical information, catalog, abstract and index the information, permanently archive the information and disseminate products in the forms and formats most useful to its customers; develop electronic and other new methods and media to disseminate information; provide information processing services to other Federal agencies; and charge fees for its products and services that permit NTIS to recover its costs.

Initiatives and Priorities

Department-wide

Accelerating the Transition to Electronic Commerce: Businesses increasingly are using e-commerce for a wide range of critical processes throughout the supply chain, from exchanging product design data to conducting financial

transactions. This trend promises to have a broad economic impact by lowering production costs and raising productivity throughout the economy. Current industry forecasts indicate that business-to-business e-commerce transactions will continue to grow rapidly, and may approach $3 trillion per year by 2003. The continued growth and efficient adoption of these practices requires new infrastructural tools and capabilities. In FY 2001, TA is requesting additional resources to collaborate with the private sector to build new infrastructure for a new economy:

- *E-commerce tools for small businesses (MEP / Electronic Commerce Outreach):* This initiative will provide tools for small businesses to adopt and efficiently use business-to-business e-commerce processes. With fewer information technology resources, small businesses often are at a disadvantage in trying to work with larger companies through business-to-business e-commerce. NIST's Manufacturing Extension Partnership (MEP), in partnership with the Small Business Administration and the Department of Agriculture, will develop an "E-Commerce Jump Start Kit" and other tools to help small business fully participate in e-commerce. MEP's nationwide system of centers and offices will help disseminate the tools to small businesses and provide additional support in adopting electronic business practices.

- *Standards for electronic data exchange (Manufacturing Interoperability) :* Businesses increasingly are using e-commerce to exchange technical data with suppliers, which can substantially decrease manufacturing costs, accelerate time to market, and improve efficiency. However, inadequate standards for exchanging highly-complex data among different software programs impose a significant cost on the economy—the automotive supply chain alone loses $1 billion annually due to this problem. NIST will develop standards and technologies to improve software interoperability for product data exchange and related applications.

- *Wireless e-commerce (Information Technology for the 21st Century):* The core of e-commerce information exchange—networks of wires and optical fiber—currently restrict mobility, accessibility, and the volume of information exchange. Wireless networks represent the future of e-commerce communications, but substantial technical advances are needed to enable widespread adoption of advanced wireless networks. NIST will develop new materials, standards, and other infrastructural technologies that the private sector needs to successfully develop and deploy wireless communications and networking technologies.

Expanding Commerce's Partnerships with Minority Serving Institutions: With the pool of well-trained U.S. technical professionals falling far behind projected needs, the Nation cannot ignore opportunities to enhance the capacity of minority-serving institutions (MSIs). MSIs educate a disproportionately large number of minority scientists and engineers, but because they suffer from a lack of resources to provide top quality training they remain an under-utilized resource. To enhance the capacity of MSIs, NIST will pursue two complementary efforts:

- *Partnering with Minority-Serving Institutions:* NIST will partner with MSIs through grants and cooperative ventures to help build capacity for training minority scientists, engineers, and technicians by improving the training and research experience of MSI faculty, providing research opportunities for undergraduate and graduate MSI students, upgrading MSI research facilities, and working with MSIs on joint technical projects benefiting both NIST and the MSIs.

- *Expanding technical training opportunities at NIST (Postdoctoral Fellowship Program):* NIST will expand its highly successful NIST/National Research Council postdoctoral fellowship—which brings top young scientists and engineers to NIST for advanced research and training—and emphasize partnering with MSIs to identify top candidates. The fellowship program enhances technology transfer between NIST, universities, and industry, and serves as an important tool to recruit new NIST technical staff.

Establishing Safeguards Against Unconventional National Security Threats: The National economy and the Federal government increasingly depend on information technology (IT) infrastructure — the computer systems, networks, software, and embedded processors that help ensure military security, enable financial transactions, control delivery of utility services, permit timely communications, control manufacturing, store and disseminate information, and conduct essentially all economic and government functions. Because this information infrastructure is complex and comprised of highly interconnected systems, even limited attacks or system failures could disrupt large segments of the economy and/or critical government services. NIST will address the crucial problem of critical infrastructure protection (CIP) through three complementary programs that combine public and private sector resources to address current and future national IT security needs. [These programs also respond to the Presidential priority of protecting critical national

infrastructures, as described in Presidential Decision Directive #63 and other communications.]

- *Expert team to identify and help fix Federal IT security vulnerabilities (CIP Expert Review Team):* NIST will establish a team of computer security experts to help Federal agencies identify and fix vulnerabilities in their software, computers, networks, and other information technology resources.

- *NIST information technology security research and development (CIP Research and Development):* NIST will conduct research to develop new security solutions for parts of the public and private sector critical information infrastructure, including advanced cryptography, development of standard security management procedures and practices, and protection of supervisory systems (used to control public utilities, automated building systems, automated manufacturing systems, and other applications).

- *Grants to develop world-leading private sector IT security research and development capacity in the United States (Institute for Information Infrastructure Protection):* NIST will establish the Institute for Information Infrastructure Protection (IIIP) to increase the security, reliability, and survivability of the information technology systems and networks that comprise the nation's information infrastructure. There is a strong need for new research into advanced technologies, tools, measurements, and test methods that can raise the level of reliability and security of critical information technology-based systems and networks. The IIIP will lead a partnership among industry, academia, and government to develop the R&D capacity, technologies, and knowledge needed to protect the Nation's critical information infrastructure.

Addressing Critical Construction and Base Program Needs: In order to continue serving industry adequately, NIST must repair, upgrade, or replace existing facilities. In FY2001, NIST will take the first step toward increasing its base for safety, capacity, maintenance, and major repairs. Planned efforts include a wide range of projects, such as continued upgrades to the fire safety system, removal of hazardous asbestos materials, replacement of compressors or antiquated control systems and electrical switch gear, replacement and repair of selected roofs and roads, improved accessibility for the handicapped, and several urgently needed construction and major renovation projects on NIST's Boulder, Colorado campus.

Effective Program and Service Delivery (Meeting Our Unfunded Mandates): The Office of the Under Secretary for works in partnership with the private sector to develop, coordinate, and advocate national policies that maximize technology's contribution to U.S. economic growth and improve living standards for all Americans. New requests from Congress and the Administration have increased the Under Secretary's responsibilities and call for additional resources in four key areas:

1) the Office of Space Commercialization (OSC) will be expanded to meet new Congressional mandates and Presidential initiatives;
2) the Partnership for the Next Generation Vehicle (PNGV) will develop an economic roadmap identifying actions needed to accelerate commercialization of the PNGV technologies, while minimizing local economic discontinuities as automotive production shifts to advanced automotive technologies;
3) the Office of the Under Secretary will expand the breadth and depth of its reporting on agency technology transfer activities; and
4) the National Medal of Technology program will seek to increase the number of high quality Medal nomination submissions, extend outreach to under-represented communities, and expand media coverage to advance the public's understanding of technology.

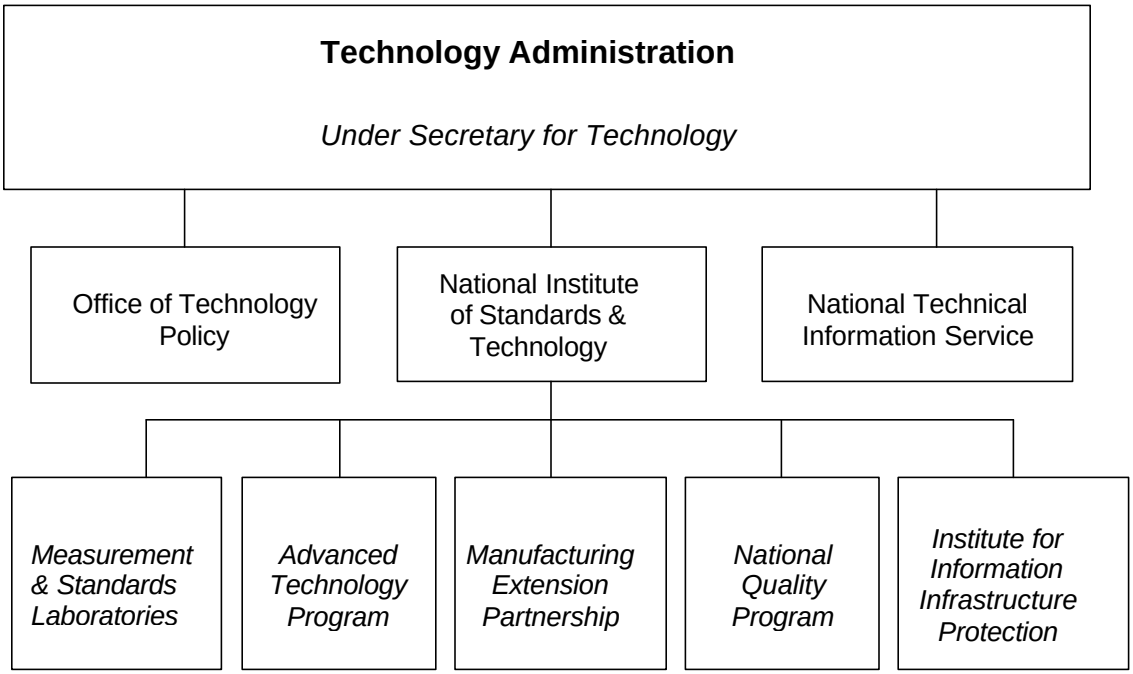
Bureau

Stimulating the Development of Advanced Technology in the Nation (Advanced Technology Program): NIST's Advanced Technology Program (ATP) provides co-funding to the private sector to accelerate the development of high-risk, broadly enabling technologies, thus helping to sustain U.S. global competitiveness. ATP is a rigorously competitive, cost-shared R&D partnership program with companies of all sizes, universities, and other research organizations. While government provides the catalyst, industry conceives, cost-shares, manages, and executes all ATP projects. ATP is in its tenth year of existence, and the evidence shows that the program is working well. The FY 2001 request of approximately $32 million would permit awarding of approximately $65 million in new R&D funding.

Enabling New Science and Technology Breakthroughs at the Atomic Scale (Nanotechnology): Nanotechnology involves understanding and manipulating things at the scale of individual atoms or small groups of atoms. At this tiny scale (on the order of a nanometer or a few billionths of an inch), the properties of materials and devices can be radically different than at "normal" scales or even microscopic sizes. For example, nanotechnology holds the promise of developing materials ten times stronger than steel but ten times lighter by manipulating individual atoms or small groups of atoms, or of building ultra-small robotic devices (too small to be seen by the unaided eye) that could travel through the human body to deliver medicines or find and destroy cancer cells. Nanotechnology will stimulate broad advances in all major economic sectors, including health care, semiconductors, communications, defense, biotechnology, and information technology. NIST is participating with several other Federal agencies in the President's National Nanotechnology Initiative to develop the science and technology to make potential nanotechnology applications a reality. NIST will develop the measurements and standards needed by industry, universities, and government research labs to exploit nanotechnology.

New Super-fast Methods of Materials and Chemical Research (Combinatorial Methods): Combinatorial methods exploit advances in information technology and automation to greatly accelerate research, development, and testing of new materials — from pharmaceuticals to metal alloys to ceramics to complex chemicals to biological products. Through combinatorial methods, scientists can conduct a very large number of experiments in parallel, rather than the traditional sequential method of conducting one experiment, checking the results, and then conducting another experiment with different conditions. Combinatorial methods have been used very successfully in the pharmaceutical industry, but have not yet been broadly adopted in other areas with great potential, including materials science, chemical synthesis, and biotechnology. NIST will develop new measurement techniques and standards to speed the application of combinatorial methods in other fields by industry, universities, and other government agencies.

Organizational Structure



Targets and Performance Summary

Performance Goal 1: Assure and improve measurements and standards			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Qualitative assessment and performance evaluation using a peer review process	N/A	N/A	N/A
Economic impact studies	N/A	N/A	N/A
Standard reference materials (SRMs) available	1,288	1,300	1,315
Standard reference data (SRD) available	60	63	66
Number of items calibrated	3,118	3,200	3,100
Technical publications produced	2,414	2,450	2,450

Performance Goal 2: Stimulate advanced technologies			
Measures	**FY 99 Estimate**	**FY 00 Target**	**FY 01 Target**
Economic impact studies	N/A	N/A	N/A
Cumulative number of technologies under commercialization	120	170	200
Cumulative number of technical publications	480	680	790
Cumulative number of patents filed	640	770	920

Performance Goal 3: Assist small manufacturers			
Measures	**FY 99 Estimate**	**FY 00 Target**	**FY 01 Target**
Increased sales attributed to MEP assistance	$443M	$595M	$748M
Labor and material savings attributed to MEP assistance	$45M	$60M	$76M
Capital investment attributed to MEP assistance	$359M	$483M	$607M
Inventory savings attributed to MEP assistance	$33M	$44M	$56M

Targets and Performance Summary (cont'd)

Performance Goal 4: Promote performance and quality management			
Measures	**FY 99 Estimate**	**FY 00 Target**	**FY 01 Target**
Number of applications per year to the MBNQA and Baldrige-based State and local quality programs	892	916	935
Number of Baldrige *Criteria* mailed by the BNQP and Baldrige-based State and local quality programs	203,700	197,600	193,600

Performance Goal 5: Protect the national information infrastructure			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Activity metrics related to program establishment - such as an operations plan, staffing, oversight and advisory boards	N/A	N/A	Successful establishment

Performance Goal 6: Analyze and develop technology policies			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Number of roundtables, seminars, and negotiations held with industry, government and academia to advance TA policy goals	25	25	25

Performance Goal 7: Collect, organize, preserve, and disseminate government scientific, technical, and business-related information			
Measures	**FY 99 Actual**	**FY 00 Target**	**FY 01 Target**
Number of items in archive	2,874,416	2,924,416	N/A
Number of documents reproduced from electronic media	721,295	750,000	N/A

Resource Requirements Summary

Total Dollars: $830,148 (thousands)

Goal	FY 99 Actual		FY 00 Enacted		FY 01 Request	
	Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
Assure and improve measurements and standards	$295,020	$119,269	$384,115	$105,416	$368,196	$106,266
Stimulate advanced technologies	$190,343	0	$142,600	0	$175,467	0
Assist small manufacturers	$127,901	$3,509	$104,180	$890	$114,137	0
Promote performance and quality management	$3,877	$2,369	$4,903	$1,600	$5,191	$1,600
Protect the national information infrastructure	N/A	N/A	N/A	N/A	$50,000	0
Analyze and develop technology policies	$10,842	$147	$7,945	$575	$8,716	$575
Collect, preserve, and disseminate government technical, scientific, and business information	$1,084	$32,211	0	$40,000	0	0

Total Bureau FTEs: 3,317 FTE

Goal	FY 99 Actual		FY 00 Enacted		FY 01 Request	
	Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
Assure and improve measurements and standards	2050	712	2041	722	2106	714
Stimulate advanced technologies	271	0	280	0	280	0
Assist small manufacturers	89	20	113	0	114	0
Promote performance and quality management	39	0	40	0	40	0
Protect the national information infrastructure	N/A	N/A	N/A	N/A	12	0
Analyze and develop technology policies	43	1	50	1	50	1
Collect, preserve, and disseminate government technical, scientific, and business information	0	322	0	260	0	0

Resource Requirements Summary (cont'd)

Total Bureau IT Dollars: $61,797 (thousands)

Goal	FY 99 Actual	FY 00 Enacted	FY 01 Request
Assure and improve measurements and standards	$48,004	$49,800	$54,834
Stimulate advanced technologies	$2,814	$3,741	$3,265
Assist small manufacturers	$2,590	$2,761	$2,853
Promote performance and quality management	$490	$561	$635
Protect the national information infrastructure	N/A	N/A	N/A
Analyze and develop technology policies	$176	$181	$210
Collect, preserve, and disseminate government technical, scientific and business information	$9,922	$7,444	0

Performance Goal 1:
Assure and Improve Measurements and Standards

Rationale for Performance Goal

The NIST *Measurement and Standards Laboratories* (MSL) develop and deliver measurement techniques, reference data, test methods, standards, and other types of infrastructural technologies and services that provide a foundation for industry in all stages of commerce: research, development, testing, production, and marketing. NIST laboratories also support U.S. firms in the global marketplace by working to eliminate trade barriers associated with different national standards, testing, and certification requirements.

Since its establishment in 1901 as the National Bureau of Standards, NIST has collaborated closely with industry to anticipate and address the Nation's measurement, standards, and technology needs. NIST's extensive and diverse interactions with industry provide an important source of information about the quality, direction, and future demand for NIST products and services.

NIST evaluates its performance and plans its work in part through direct customer feedback, but also through three distinct evaluation mechanisms: peer review and other forms of external assessments; economic impact studies; and quantitative output tracking. Each of NIST's programs uses a different mix of these three evaluation mechanisms, tailored to each program's distinct goals, outputs, and management needs. Taken alone, no individual measurement mechanism provides a singularly robust and comprehensive source of performance evaluation data. Taken together, however, all three evaluation mechanisms—combined with continual feedback from customers—collectively provide NIST management as well as external stakeholders with a highly detailed, rich and reliable set of performance data encompassing NIST's strategic goals.

Measure 1.a:
Qualitative assessment and performance evaluation using peer review

Since 1959 the NIST Measurement and Standards Laboratories have been reviewed annually by the National Research Council. The current NRC Board on Assessment of NIST Programs is composed of approximately 150 scientists and engineers, organized into seven panels (one for each of the seven NIST laboratories) plus two subpanels for specialized programs. Panel reviews are reported at the Division level (the major organizational unit for the laboratories), and build upon assessments of research processes at the project and program levels.

The NRC Board on Assessment review is independent, technically sophisticated, and extensive. Each panel conducts a two- to three- day on-site review of an individual laboratory's technical quality, with particular attention to the following factors:

- Technical merit of the laboratory programs relative to the state-of-the art.
- The degree to which the laboratory programs conform to their mission.
- The effectiveness with which the laboratory programs are carried out and the results disseminated.
- The adequacy of the laboratory's facilities, equipment, and human resources, insofar as each affects the quality of the technical programs.

Data Validation and Verification:

Data collection: NRC Board on Assessment panels observe and analyze each MSL lab.
Frequency: Annual
Data storage: NRC
Verification: NRC independence and high technical capability; internal NRC quality controls.
Data limitations: Data are inherently qualitative and non-cumulative
Actions to be taken: None available

NRC panel reports for each laboratory become the basis for a comprehensive annual peer review report of the NIST MSL [The most recent NRC report, covering FY 1999, was released in October 1999 and can be viewed at http://www.nap.edu/books/NI000763/html/]. The NRC report provides each laboratory not only with an external quality assessment, but also with a valuable source of information for its own performance assessment, planning, and management functions. For FY 2001, the NRC will again review the MSL, and NIST will seek to obtain similarly strong findings as those provided in FY 1999 (see table below). To complement this peer review information, the

Performance Goal 1: Assure and Improve Measurements and Standards

complement this peer review information, the MSL will continue to compile benchmarking data that compare specific NIST measurement capabilities and practices relative to those of other national metrology institutes (NMIs), measurement laboratories, and industry measurement needs.

Measure 1.b: Economic impact studies

NIST augments the performance data obtained through peer review and benchmarking with formal microeconomic impact assessments of the long-term impacts of specific research projects. These studies provide qualitative assessments and quantitative estimates of the economic impacts resulting from the different types of technology infrastructure that NIST provides to U.S. industry. These impacts include increases in R&D efficiency and manufacturing productivity, enhanced product quality, and lower market transactions costs. Where data allow, quantitative estimates are provided in one of several generally acceptable forms: net present value, benefit-cost ratio, or internal rate of return.

NIST has been conducting economic impact studies on a regular basis since 1992. In addition to demonstrating consistently strong social rates of return and positive benefit/cost ratios, these studies provide NIST management with detailed information that is useful for evaluating current and prospective research projects and for supporting strategic planning processes.

Currently, about five new impact studies are initiated annually, focusing on projects with substantial histories. Because such studies are conducted intermittently and at the project level, they cannot be used to generate cumulative quantitative impact data for annual GPRA reporting. Recent economic impact studies and related information are available at: http://www.nist.gov/director/planning/strategicplanning.htm.

Data Validation and Verification:

Data collection Research is contracted to economic and technical experts, who generate quantitative estimates and qualitative information using performance data gathered through industry surveys and field research. Project cost data are supplied by NIST.
Frequency Intermittent.
Data storage Contractors collect and maintain all data. Survey results, cost data, and all calculations are presented in final reports.
Verification Data are gathered and analyzed by highly qualified economists and technical specialists using well-developed research methods and standard economic and business analysis metrics, as specified and monitored by NIST.
Data limitations Elements of study population s often are too diffuse to measure; availability and quality of industry data often are uneven; impact estimation typically requires counterfactual data, which can be difficult to estimate; outcomes are specific to each project—e.g. results are not cumulative and not readily comparable.
Actions to be taken Data collection is limited temporally and spatially to maximize data reliability.

Performance Goal 1:
Assure and Improve Measurements and Standards

Table: Summary of FY 1999 NRC Peer Review Findings

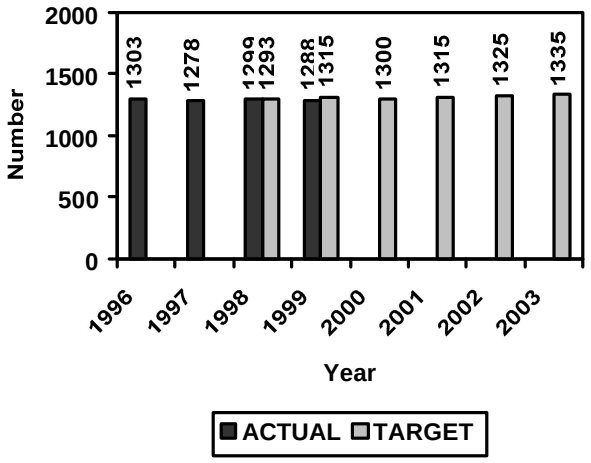
LAB	NRC Summary Finding, FY 1999*
Electronics and Electrical Engineering (EEEL)	..."[T]he technical activities under way in the EEEL are producing important results that have significant impacts on relevant industries. Given that the laboratory's mission to provide measurement capabilities for the U.S. electronics and electrical industries is very broad, EEEL management must make careful decisions about how to best utilize the limited resources available to NIST. The panel applauds the laboratory's historically verified ability to select specific areas for focused activities with carefully targeted impacts."
Manufacturing Engineering (MEL)	"Overall the laboratory continues to make significant technical progress and to contribute substantially to the manufacturing industries. Benchmarking exercises have shown that much of the MEL's work is among the best in the world. Programs and projects being pursued are supportive of both the MEL and the NIST missions, and the laboratory has made good progress in developing criteria for program prioritization. Continued effort will result in even more appropriate criteria and in their application in all MEL divisions."
Chemical Science and Technology (CSTL)	"The technical work of the CSTL provides high-quality chemical measurement capabilities and state-of-the-art basic and applied research in a broad range of technical areas. In conformance with the NIST mission, the laboratory maintains an array of programs that foster development of the essential measurement standards and technologies for both current and future technical needs of U.S. industry. The breadth of scientific research and expertise in CSTL reflects the range of customers that benefit from the laboratory's work-encompassing the newer semiconductor, aerospace, and biotechnology industries as well as the more mature chemical processing, health, and energy-related industries."
Physics (PL)	"The work of the [PL] is a mix of both basic and applied research. The basic research, in particular, calls for assessment against standards of quality rather than numerical objectives. Overall, the panel found the work of the laboratory to be of high technical merit. The staff of the laboratory represent one of the world's finest assemblages of talent in many areas of physics. In many cases, research is at or defines the state of the art in its field. Research programs and projects are generally appropriate to the mission of the laboratory and of NIST."
Materials Science and Engineering (MSEL)	"The panel found the quality of all programs to be very high as well as supportive of the laboratory's mission to stimulate more effective production and use of materials by working with materials suppliers and users to ensure the development and implementation of the measurements and standards infrastructure for materials. As confirmed by recent literature citation index analyses, surveys, and workshops, the advances by the laboratory are held in the highest regard by materials industry and research personnel both in the United States and abroad. This leadership in the characterization and measurement of materials is very important to maintaining U.S. materials industries' strong position in the global marketplace."
Building and Fire Research (BFRL)	"The technical merit of the work performed in the BFRL is very high. The current array of programs supports the laboratory's mission and contributes to the U.S. effort to meet the national construction technology goals for research and development, which include reduced operation, maintenance, and energy costs and increased health and safety. Overall, the laboratory has world-class researchers that exhibit great enthusiasm and dedication."
Information Technology (ITL)	"Overall, the panel found that the technical work under way in the ITL was of high quality and that projects are appropriate and well aligned with the laboratory and division missions. This laboratory services a broad range of customers through three essentially different types of activities: research related to measurements and standards for information technology, collaborations with other NIST laboratories in mathematics, statistics, and computational science, and technical infrastructure support services, such as maintenance of computer hardware and networks on the NIST campus. The ITL works hard to fulfill the diverse demands of its mission and is making progress on appropriately integrating the various components of the laboratory into a coherent whole that can take full advantage of the potential synergies among the wide range of expertise residing within the ITL."

*Summary findings were provided by NRC Board on Assessment of NIST Programs on 8/5/99. The complete FY 1999 review document was published in October, 1999 and can be viewed at: http://www.nap.edu/books/NIooo763/html/

Performance Goal 1:
Assure and Improve Measurements and Standards

In part due to the long time frame and intermittent character of economic impact assessments, NIST also tracks MSL's responses to the Nation's established measurement needs NIST through a series of quantitative metrics that track key product and service outputs, such as standard reference materials (SRMs), reference data, and instrument calibration services. These three output metrics convey useful information to management regarding the production and dissemination of particular NIST products and services. However, these output metrics do not provide information about the quality or impact of particular products and services. Moreover, they do not comprehensively represent the output from NIST laboratories. For instance, the technical expertise needed to generate and deliver these products and services supports effective participation in national and international standards organizations. Through these organizations NIST supports the harmonization of measurement and standards practices, which in turn promotes international trade and domestic economic growth.

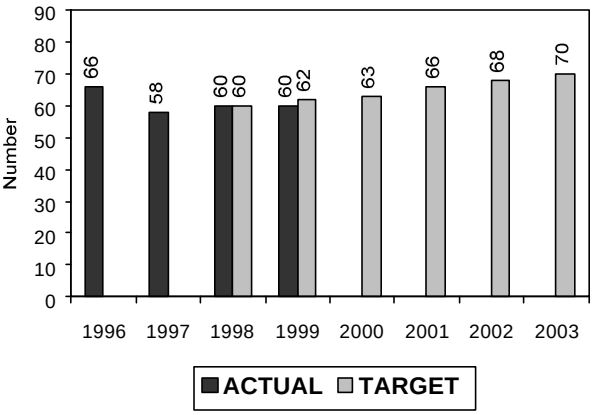
Measure 1.c:
Standard reference materials (SRMs) available



Data Validation and Verification:

Data collection NIST Standard Reference Materials Program.
Frequency Ongoing
Data storage NIST's Standard Reference Materials Program.
Verification Data represent direct and verifiable counts of SRMs produced. Internal verification includes review by NIST Technology Services and NIST Director's Office. Financial data associated with SRM sales are included in NIST's audited financial statements.
Data limitations Data provide information on output levels only; the aggregate quality, composition, and other factors may have a larger bearing on downstream impact than the aggregate level of production.
Actions to be taken There are no obvious replacements for output tabulations due in part to the diverse array of SRMs produced by NIST as well as to the lack of a direct or systematic relationship between volume and impact. Nevertheless, NIST continues to explore alternative metrics that could capture leverage in the secondary market and other factors related to downstream impact.

Measure 1.d:
Standard reference data (SRD) available

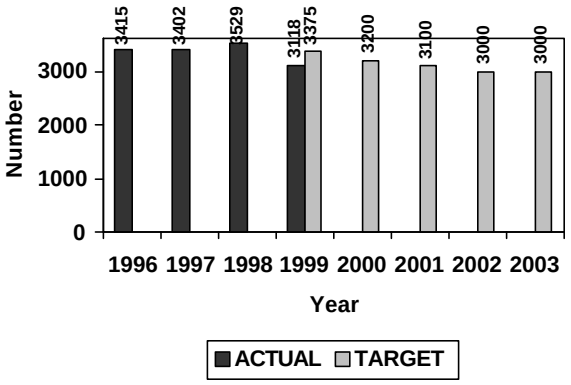


Data Validation and Verification:

Data collection NIST Standard Reference Data Program.
Frequency Ongoing
Data storage NIST's Standard Reference Data Program.
Verification Data represent a direct and verifiable count of SRD products developed and disseminated by NIST. Internal verification includes review by NIST Technology Services and NIST Director's Office. Financial data associated with SRD sales are included in NIST's audited financial statements.
Data Limitations Data provide information on output levels only; factors such as the aggregate composition of databases as well as the mode of access and user interface may have a significant bearing on downstream impact. In addition, output tabulations of data collections do not capture work entailed in updating existing databases.
Actions to be taken There are no obvious replacements for output tabulations due in part to the diverse array of SRD produced by NIST as well as to the lack of a direct or systematic relationship between the number of databases available and impact. Nevertheless, NIST continues to explore alternative metrics that could capture use rates, leverage, and other factors related to downstream impact.

Performance Goal 1:
Assure and Improve Measurements and Standards

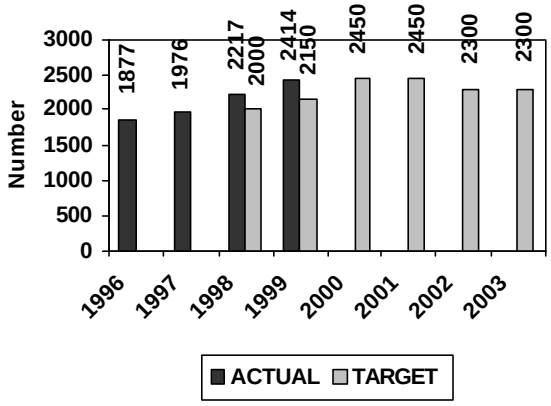
Measure 1.e:
Number of items calibrated



Data Validation and Verification:

Data collection NIST Calibration Services Program.
Frequency Ongoing
Data storage NIST's Calibration Services Program.
Verification Data represent direct and verifiable counts of items calibrated by NIST MSL. Internal verification includes review by NIST Technology Services and NIST Director's Office. Financial data associated with calibration sales are included in NIST's audited financial statements.
Data limitations Data provide information on service output levels only and represent a measure of throughput but not workload per se, as the number of tests and/or time and calibration effort required can vary substantially across items. As with SRMs and SRD, downstream impact is a function of the nature of individual calibration services more than the sheer volume of items calibrated.
Actions to be taken There are no obvious replacements for output tabulations due in part to the diverse array of calibration services produced by NIST as well as to the lack of a direct or systematic relationship between service volume and impact. Nevertheless, NIST continues to explore alternative metrics that could capture leverage in the secondary market and other factors related to downstream impact.

Measure 1.f:
Technical publications produced



Data Validation and Verification:

Data collection NIST Office of Information Services.
Frequency Ongoing
Data storage Publications data are gathered and maintained by NIST Office of Information Services.
Verification Data represent direct and verifiable counts of NIST technical publications that have been cleared for publication by the internal Washington and Boulder Editorial Review Boards. Internal verification includes review by NIST Technology Services and NIST Director's Office.
Data limitations Data are not adjusted for quality and do not capture utility or impact.
Actions to be taken NIST is developing a subcategory measure of publications in peer review journals as a proxy for quality, and is exploring the cost-effectiveness and validity of conducting regular citation tracking as a proxy for breadth of dissemination (partially indicative of impact).

Technical publications are a primary product of NIST's research activities in measurement science and technology. Many of these publications appear in prestigious scientific journals and withstand peer review by the scientific community. Others appear in technological forums where measurement standards and technologies developed by NIST staff (at times in collaboration with private sector partners) are disseminated. NIST uses publications as one of the mechanisms to transfer the results of its work to the U.S. private sector or to other government agencies that need cutting-edge measurements and standards.

Performance Goal 1:
Assure and Improve Measurements and Standards

Program Evaluation Efforts

The programmatic objectives and performance of the Measurement and Standards Laboratories are reviewed regularly by the Visiting Committee on Advanced Technology, a legislatively mandated panel of 15 external advisors that meets quarterly to review NIST's general policy, organization, budget, and programs.

Objectives and Strategies

Objectives	Strategies
Anticipate and address the Nation's most important needs for physical and information-based measurements and standards.	· Work with industry, government, and the scientific community to identify the science and technology required for a robust measurement and standards infrastructure. · Perform laboratory research that develops the measurement tools, data, and models for advanced science and technology.
Strengthen the national system of standards, measurement, measurement traceability, and conformity assessment.	· Promote the efficient delivery of measurement services to meet both current and future infrastructure needs. · Foster the development of domestic voluntary standards needed by government and industry. · Stimulate the development of a robust private conformity assessment system in the United States.
Provide leadership in harmonizing international measurements and standards to facilitate international trade.	· Compare measurement systems and practices with other industrialized countries, to assure consistency and eliminate measurement-related reasons for duplicate testing. · Foster international voluntary standards needed by government and industry. · Collaborate with international standards organizations and counterpart laboratories in researching and developing standards · Use training and consultation to strengthen national metrology systems.

Resource Requirements

Total Dollars: $368.2 million - direct, $106.3 million - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$295.0 M	$119.3 M	$384.1 M	$105.4 M	$368.2 M	$106.3 M

Total FTE: 2,106 - direct, 714 - reimbursable
MSL professional staff consists of 54% Ph.D., 19% MA/MS, 18% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
2050	712	2041	722	2106	714

Performance Goal 1: Assure and Improve Measurements and Standards

Total IT Dollars: $54.8 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$48,004	$49,800	$54,834

Cross-Cutting Issues

Intra-DOC

NIST plays a large role in a wide variety of intra-governmental and government-industry coordination committees. For example, NIST has leadership positions on the committees, subcommittees, and working groups of the National Science and Technology Council (NSTC).

Other Government Agencies

NIST provides research and services in measurement and standards to almost every other agency in the Federal government with scientific missions, contracted through specific Interagency Agreements or Memoranda of Understanding. NIST measurement research, services, and facilities have long contributed to national defense and security, to the nationwide safety and quality-assurance systems that ensure the accuracy of health care measurements, to the accuracy of environmental measurements, and to law enforcement standards.

External Factors and Mitigation Strategies

Industry-specific business conditions and technological developments affect the level and range of demand for NIST products and services over time. For instance, annual demand for calibrations—only one of numerous outputs of the Measurement and Standards Laboratories—can fluctuate due to several factors outside of NIST's control, including changes in the calibration intervals of large customers, changes in the average calibration interval rate in any given year, consolidation of calibration activities within large R&D organizations, and industry consolidation (as, for example, in defense-related industries).

In general, NIST seeks to mitigate the effects of external technological and market uncertainties by maintaining varied and close relationships with its customer base. Through conferences, workshops, technology roadmaps, and many other forms of interaction with its customers, NIST regularly evaluates and adjusts to the direction and level of demand for measurements, standards, reference data, test methods, and related infrastructural technologies and services.

Performance Goal 2: Stimulate Advanced Technologies

Rationale for Performance Goal

Market pressures often deter firms from investing in particular types of technology and R&D projects. For instance, private industry does not account for a large percentage of the Nation's basic R&D, because firms must be able to earn appropriate returns within a time frame and at a level satisfactory to investors. For the same reasons, industry tends to avoid investing or significantly under-invests in certain types of enabling technologies: infrastructural technologies, which require distinct competencies and are broadly applied; multi-use technologies, which benefit multiple segments of an industry or group of industries; and high-potential breakthrough technologies, which typically involve risk levels and time frames that far exceed the horizons of individual firms. In each of these areas, the financial and market interests of individual firms tend to produce a sub-optimal level of investment for the economy and society as a whole. To address this problem, the Advanced Technology Program (ATP) provides industry with the opportunity to invest in and develop innovative technologies that promise significant commercial payoffs and broad benefits for the Nation.

The ATP has developed a sophisticated combination of assessment tools through which it evaluates its impact on the economy. In addition to program guidance provided by the Visiting Committee on Advanced Technology and NIST management, the ATP also evaluates its performance through economic assessments of project developments and long-term impacts, estimates of interim outcomes, status reports on completed projects, and output tabulations.

Measure 2.a: Economic impact studies

The Advanced Technology Program uses a wide range of evaluation mechanisms to assess the long-term impacts associated with ATP-funded projects. Evaluation activities include planning, developing evaluation models and methods, collecting data and constructing databases, and conducting micro- and macro-economic case studies, statistical and econometric analyses, and other forms of assessment and inquiry. Fully successful ATP projects are expected to contribute significantly to the U.S. scientific and technical knowledge base, yield private benefits to the innovators, and, ultimately, yield benefits to others in the Nation—through market, knowledge, and/or network spillovers extending well beyond the direct award recipients. Significant impacts can result from even partial successes. To assess these outcomes, ATP conducts or contracts economic impact studies that seek to quantify private rates of return, social-rates-of-return, and public rates of return (the social-rate-of-return component attributable to the ATP). Evaluation studies address single projects and groups of projects, as well as issues of special concern to policy makers and program management.

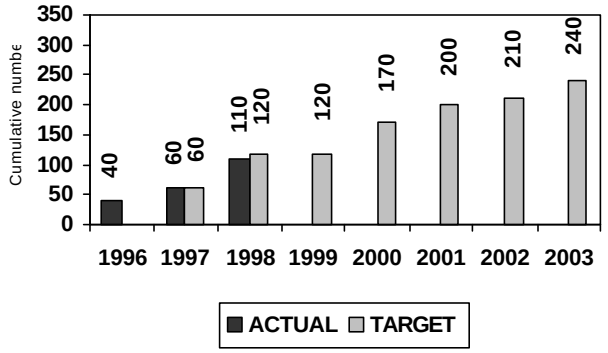
Data Validation and Verification:

Data collection Data collected for ATP's Economic Assessment Office databases (see output metrics section below) are supplemented with data collected by external economic and technical experts, who generate qualitative information and quantitative estimates using data from field research and other public and private databases.
Frequency Intermittent.
Data storage Research methodology and results are presented in final reports; some data are integrated with existing ATP databases.
Verification Data collected and analyzed by contractors, as well as the methodology and results of the data analysis, are rigorously reviewed by NIST economists and technical experts as well as by external experts in evaluation.
Data limitations The time period from ATP funding to economic impacts is long and entails substantial market and technological uncertainties at the point impact studies are undertaken. Few projects are sufficiently mature to assess their impacts; in some cases, projections are used to estimate potential impacts. As with project-level impact assessments in general: results are intermittent and not cumulative; elements of study population s often are too diffuse to measure; availability and quality of industry data often are uneven; impact estimation typically requires counterfactual data, which can be difficult to estimate; outcomes are specific to each project—e.g. results are not cumulative and not readily comparable.
Actions to be taken Studies use the best available estimation techniques and are subject to extensive external and internal review.

To complement its highly focused economic impact studies, ATP also measures and evaluates a wide range of broader output indicators. Below are data for three key output metrics—the number of technologies commercialized as a result of ATP project funding, as well as the number of patents and publications generated by ATP-funded projects.

Performance Goal 2:
Stimulate Advanced Technologies

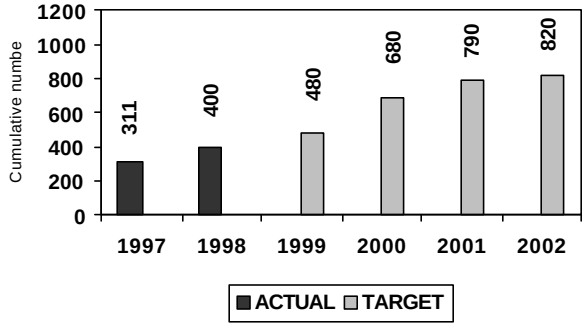
Measure 2.b:
Cumulative number of technologies under commercialization



Data Validation and Verification:

See below.

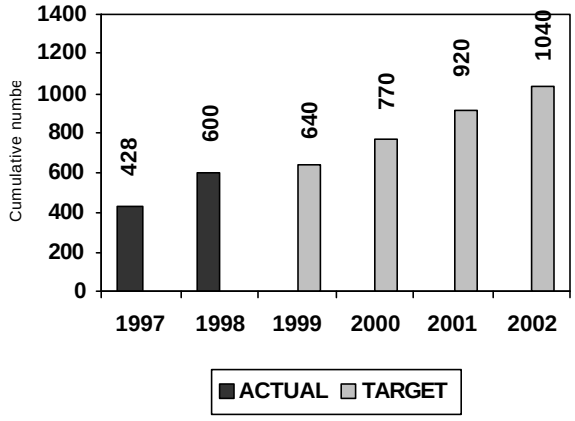
Measure 2.c:
Cumulative number of technical publications



Data Validation and Verification:

See below.

Measure 2.d:
Cumulative number of patents filed



Data Validation and Verification:

See below.

Performance Goal 2: Stimulate Advanced Technologies

Data Validation and Verification::
ATP Technologies Commercialized, Publications, and Patents Filed

Data collection Data are gathered from the portfolio of ATP project participants since 1993 through company filings of patent information to the NIST Grants office (a legal requirement) and an electronic survey instrument under ATP's Business Reporting System (BRS). Separate portfolio-based telephone surveys are conducted of project participants funded prior to 1993 and for post-project data collection.
Frequency Annual over the course of ATP funding for projects funded since 1993; intermittent for projects funded prior to 1993; every two years (up to six years) after ATP funding ends.
Data storage BRS data are maintained by ATP's Office of Economic Assessment in an integrated set of databases covering both descriptive information about the funded organizations and survey responses for all participants in ATP-funded research projects.
Verification ATP's Business Reporting System has been evaluated by external auditors. In addition, all ATP reports using BRS data and patent reports filed through the NIST grants office are monitored closely by ATP for research quality and are subject to extensive NIST-wide review and critique prior to being issued.
Data limitations The BRS electronic survey and other telephone survey instruments represent a standardized reporting system. Standard sources of uncertainty include: variation in interpretation of specific questions; variation in the estimation techniques used in response to specific questions; variation in the quality of industry data; missing values; etc.
Actions to be taken Standard survey techniques already are used to clean the data and assure completeness, accuracy and reliability. Survey response rates already are high—nearly 100 percent for recipients of single-company awards, and 80-90 percent for individual participants in ATP joint ventures.

Program Evaluation Efforts

The programmatic objectives and performance of the Advanced Technology Program are reviewed regularly by the Visiting Committee on Advanced Technology, a legislatively mandated panel of 15 external advisors that meets quarterly to review NIST's general policy, organization, budget, and programs. In addition, the ATP has been subject to a number of external reviews focused on program performance over the course of its 10 year existence. Currently the ATP is the subject of a broad programmatic review by the NRC Board on Science, Technology, and Economic Policy. The first volume of this review, entitled *The Advanced Technology Program: Challenges and Opportunities*, was published in 1999 and is available from the National Academy Press.

In addition to external evaluation, the ATP also conducts internal evaluations to complement the performance information provided for GPRA. For instance, the ATP has begun a series of Status Reports that detail the progress of completed project.[1] In addition, the ATP periodically conducts broad analyses of the data collected through its Business Reporting System, providing a basis for assessing the ATP's progress toward major programmatic objectives (the most recent report found, for instance, that eighty-six percent of ATP-funded organizations are already ahead in their R&D cycle as a result of ATP funding, and acceleration in time-to-market by two years or more is anticipated for 62 percent of planned commercial applications).[2]

To complement its economic analyses, the ATP has established a database to capture quantitative information about the technical progress of ATP-funded projects. This database will help ATP identify and address systemic issues to improve the success of ATP-funded projects, facilitate continuous improvement of ATP's operations, and allow ATP to easily examine and present aggregated information about the status of its portfolio of active and completed projects.

1. See William F. Long, Performance of Completed Projects: Status Report Number 1 *NIST Special Publication 950-1 (March 1999). Available at:*
2. Jeanne W. Powell, Development, Commercialization, and Diffusion of Enabling Technologies: Progress Report for ATP Projects Funded 1993-1995 *(NISTIR 6098; 1997). An update of this report will be available in FY 2000.*

Performance Goal 2: Stimulate Advanced Technologies

Objectives and Strategies

Objectives	Strategies
Encourage industry to increase investment in R&D for high-risk, broad-impact technologies.	· Identify and fund ATP-industry partnerships for the development of emerging, infrastructural, and/or multi-use technologies. · Emphasize cooperative R&D projects. · Expand partnership activities with both the public and private sectors, and strengthen linkages to external sources of innovation-such as small entrepreneurial firms, universities and other sources of basic research, and new research consortia.
Accelerate the commercialization and broad diffusion of ATP-funded technologies.	· Facilitate linkages between ATP award winners and other financial and organizational resources. · Encourage rapid dissemination of information about ATP-funded technologies.

Resource Requirements

Total Dollars: $175.5 million

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$190.3 M	0	$142.6 M	0	$175.5 M	0

Total FTEs: 280
ATP professional staff consists of 49% Ph.D., 33% MA/MS, 16% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
271	0	280	0	280	0

Total IT Dollars:$3.3 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$2.8 M	$3.7 M	$3.3 M

Performance Goal 2: Stimulate Advanced Technologies

Cross-Cutting Issues

Other Government Agencies

The ATP leverages the expertise of scientists and engineers from a wide variety of government agencies and laboratories to participate on the ATP's Source Evaluation Boards. In addition, the ATP Program Managers work with Program Managers from other government agencies to ensure that projects are complementary and relevant—coordination committees in several disciplines have been brought together for this purpose. This also affords an opportunity to examine government R&D from a high level for specific technologies.

External Factors and Mitigation Strategies

ATP has little control over many aspects of the performance measures listed in this document. For instance, the rate at which ATP-funded technologies are commercialized will vary in part due to technological uncertainties intrinsic to the R&D enterprise. In addition, other metrics such as publications and patenting rates will be affected not only by the level of technologies commercialized but also by company-specific strategies and market conditions. For example, patenting is more common in some industries than others, and a variety of factors affect the patenting and/or publishing choices of individual firms. Variation in growth rates and development trajectories add additional uncertainty; some technologies are commercialized rapidly once the research is completed, while others require extensive product development and clinical trials before significant commercialization can occur. There are no practical mitigation strategies for these external sources of uncertainty, other than maintaining robust program management and data collection systems: the ATP insists that its companies abide by the terms and conditions of the cooperative agreement, which include intellectual property and commercialization provisions.

Performance Goal 3: Assist Small Manufacturers

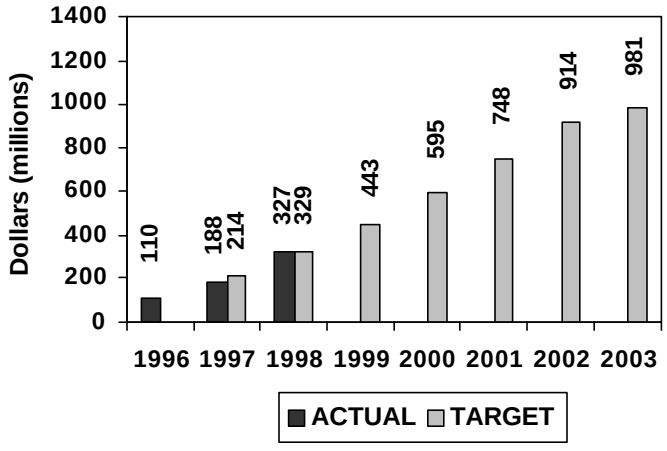
Rationale for Performance Goal

While the United States manufacturing sector as a whole is among the most productive in the world, small manufacturers consistently lag behind their larger counterparts. The Nation's nearly 400,000 small plants and factories employ about 12 million people—nearly two-thirds of all manufacturing jobs—and produce intermediate parts and equipment that contribute substantially to the value of finished products. Due to the pervasive role of small firms in the manufacturing supply chain, the future productivity of the Nation's overall supply base will rest largely on the ability of small firms to improve their quality, raise their efficiency, and lower their costs.

The comparatively low productivity growth of small U.S. firms can be attributed to numerous factors, including technical, cost, and information barriers. Through the Manufacturing Extension Partnership (MEP) Program, NIST helps to overcome these barriers by providing information, decision support, and implementation assistance in adopting new and more advanced manufacturing technologies, techniques, and business practices.

MEP evaluates its performance through a combination of methods including: 1) independent evaluation of MEP program plans and policies by the MEP National Advisory Board; 2) legislatively-mandated independent panel reviews of individual MEP center operations and outcomes conducted against criteria adapted from the Malcolm Baldrige National Quality Award; and 3) regular program oversight and periodic review of individual MEP center operations and outcomes by NIST staff. These reviews and assessments are based on a variety of objective performance metrics, most particularly those relating to impacts on client competitiveness, derived from regular surveys conducted by the Bureau of the Census; and analysis of more detailed information regarding the operations and performance of individual centers. The following four performance measures record the impact of MEP assistance on several key business indicators, which collectively illustrate MEP's impact on key aspects of its clients' competitiveness.

Measure 3.a: Increased sales attributed to MEP assistance

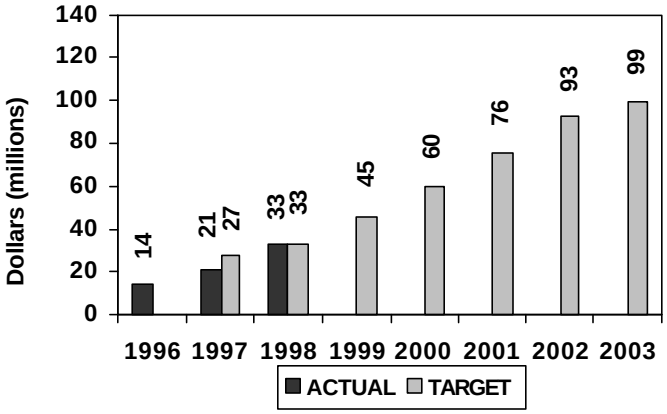


Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

Performance Goal 3: Assist Small Manufacturers

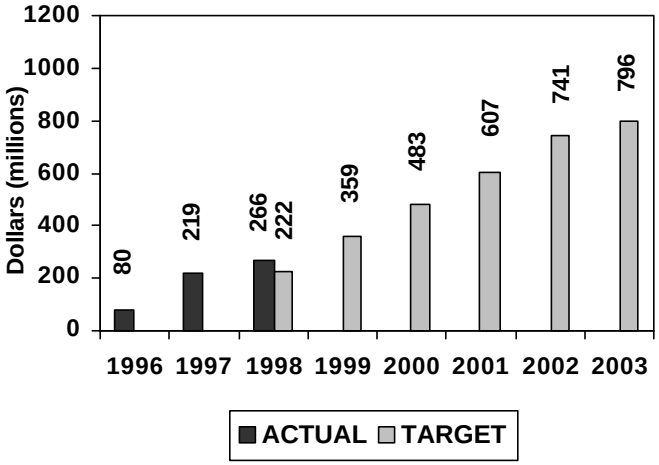
Measure 3.b: Labor and material savings attributed to MEP assistance



Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

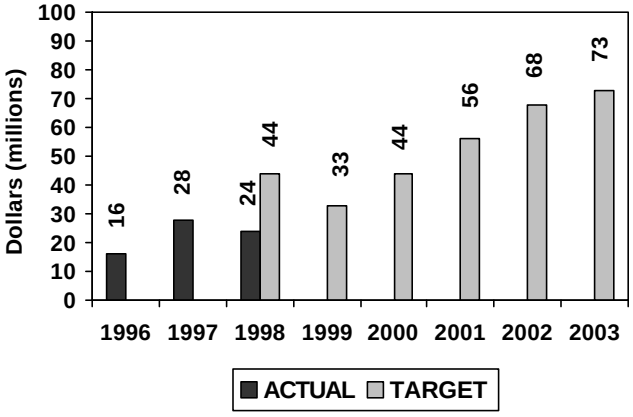
Measure 3.c: Capital investment attributed to MEP assistance



Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

Measure 3.d: Inventory savings attributed to MEP assistance



Data Validation and Verification:

(See below for validation and verification information on all four MEP metrics.)

Performance Goal 3: Assist Small Manufacturers

Data Validation and Verification: MEP Competitiveness Indicators

Data collection To measure the impact of services on clients, MEP centers submit activity data reports to the Bureau of the Census, which uses these reports to plan and conduct surveys of MEP clients. Census compiles the survey data, manages the data to ensure confidentiality, and forwards the data results to MEP.
Frequency Surveys are conducted monthly on a rolling basis, 10 months after project completion; MEP generates and analyzes totals biannually.
Data storage MEP cumulates and stores Census survey data in an Oracle database.
Verification Internal verification includes review by the NIST Director's Office. In addition, DOC IG office audit of MEP's performance measurement system will add external verification (audit begun on 7 November 1999).
Data limitations Measures represent partial impact indicators. Many of the benefits of MEP services are intangible, difficult to quantify, and/or are qualitative in nature. In addition, the time period over which impacts are realized often is different from the 10-month survey period (some impacts take time to become apparent to clients; others extend over longer periods).
Actions to be taken MEP has responded to these problems by limiting impact measurement to 10 month periods (thereby forgoing estimates of cumulative or recurring benefits) and limiting the number of indicators reported to well-defined and quantifiable business indicators (thereby forgoing more comprehensive impact reports).

Program Evaluation Efforts

MEP's National Advisory Board regularly provides external and independent evaluations of MEP's program plans and policies. In terms of organizational processes, evaluation is integral to MEP's operations. MEP evaluates the performance of its centers on an ongoing basis, providing detailed analyses of the operations and performance of individual centers. MEP's evaluation system is described in a recent report to Congress entitled "The NIST Manufacturing Extension Partnership: A Network for Success: A Review of Results and the Evaluation Process" (US Department of Commerce, Technology Administration, NIST, July 1999).

Objectives and Strategies

Objectives	Strategies
Transform a larger percentage of the Nation's small manufacturers into high performance enterprises.	· Provide MEP Centers and clients with access to a wider range of technologies and business practices by generating an integrated knowledge network focused on high performance processes, market dynamics, technological trends, and competitiveness indicators. · Improve each Center's effectiveness and efficiency by improving the level of technical capacity in the field and assisting Centers in developing effective management information systems.

Performance Goal 3: Assist Small Manufacturers

Resource Requirements

Total Dollars: $114.1 million

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$127.9 M	$3.5 M	$104.2 M	$0.9 M	$114.1 M	$0.0 M

Total FTEs: 114
MEP professional staff consists of 11% Ph.D., 74% MA/MS, 11% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
89	20	113	0	114	0

Total IT Dollars: $2.9 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$2.6 M	$2.8 M	$2.9 M

Cross-Cutting Issues

Intra-DOC

MEP assisted DOC's International Trade Administration in making the Self-Help Tool for Y2K analysis, remediation and compliance available to foreign small businesses; in presenting Y2K workshops in Indonesia, Malaysia and Korea; and in distributing foreign language versions of the Tool and CD-ROM both internationally and in the U.S. through the MEP Y2K Help Center.

There have also been meetings between MEP and ITA's U.S. and Foreign Commercial Service concerning collaboration to open global markets to American small and medium-sized manufacturers interested in, but new to, exporting activities.

Other Government Agencies

MEP collaborates with a wide range of agencies, including the Department of Agriculture (with projects serving forestry and food processing industries, promoting sustainable development and providing outreach assistance to clients for implementing a Y2K compliance project); Department of Defense (regional recycling efforts with the Navy); Department of Energy (technology development from DoE labs; Energy, Environment and Manufacturing Assessment Protocol); Environmental Protection Agency (Pollution Prevention; Environmental Best Practices for Metal Finishing and Printing Industries; Environmental Service Provider Networks; Recycling Market Development; Energy, Environment and Manufacturing Assessment Protocol (with DOE); collaborative promotion of sustainable develop-

Performance Goal 3: Assist Small Manufacturers

ment); Department of Health and Human Services (collaboration with the National Institute for Occupational Safety and Health regarding Center health & safety services); Department of Housing and Urban Development (Center workforce development model being adapted to HUD empowerment zones and collaboration on Y2K outreach assistance); Department of Labor (One Stop Career Center; School to Work Project); National Science Foundation (adapting NSF curricula); National Aeronautics and Space Administration (NTTC Technology Mining Project; field agent training); and the Small Business Administration (collaboration in providing outreach assistance to clients for implementing a Y2K compliance project).

External Factors and Mitigation Strategies

The economic and technological environment for small manufacturers in the United States continues to change rapidly. To maximize its effectiveness MEP must not only respond rapidly to its clients' changing needs, but also anticipate changes in the business environment facing small manufacturers. In areas such as e-commerce, where technological developments are revolutionizing the competitive landscape for virtually all small businesses, MEP has been working aggressively to develop solutions to common needs among its client base. However, anticipating and developing solutions to broad business challenges requires a 2-3 year time horizon and commensurate long-term budget and planning commitments.

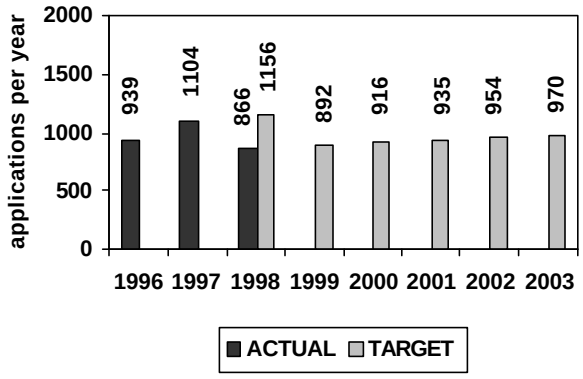
Performance Goal 4:
Promote Performance and Quality Management

Rationale for Performance Goal

As the 21st century unfolds, quality and performance improvement have become requirements—not options—for competitive businesses and high-performance organizations of all types. Through the Malcolm Baldrige National Quality Program (BNQP), NIST provides a systematic and well-tested set of business values, performance criteria, and assessment methods that all organizations can adopt to improve their productivity and effectiveness. Overall, the BNQP catalyzes the business community to define what organizations must do to improve their performance and attain (or retain) market leadership, and it provides a mechanism for broadly disseminating that information.

The Baldrige National Quality Program evaluates its performance through a combination of methods including: 1) independent expert review of all aspects of the BNQP's plans and operations by its Board of Overseers, combined with other annual reviews provided by the Panel of Judges and the Foundation for the Malcolm Baldrige National Quality Award (MBNQA); 2) output tabulations, such as the number BNQP *Criteria for Performance Excellence* distributed by mail; and 3) periodic surveys and other assessments of the program's relevance to corporate performance. In FY 2000, the BNQP expects to complete a formal economic impact assessment to evaluate the Program's longer-term economic impact on corporate performance management practices, profitability, and other business factors.

Measure 4.a:
Number of applications per year to the MBNQA and Baldridge-based state and local quality programs

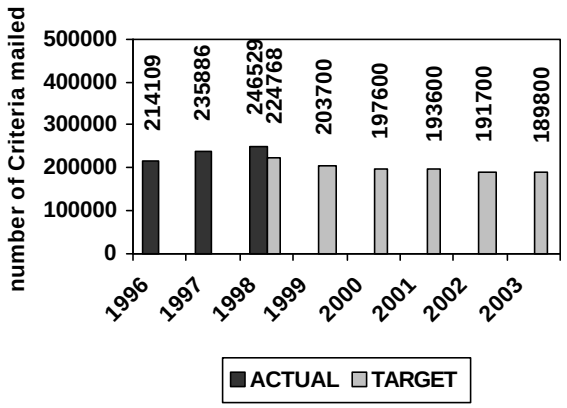


Data Validation and Verification:

Data collection Application data are collected and tracked by the Baldrige National Quality Program.
Frequency Based on the application cycle. Data from State and local programs is collected annually.
Data storage Baldrige National Quality Program.
Verification Data represent direct and verifiable counts of BNQP business activities and processes. Internal verification includes review by the Director's Office.
Data limitations The data are partial representation of BNQP's output. The application count does not capture the large number of organizations that use Baldrige criteria internally but do not formally apply for MBNQA or other Baldrige-based awards. Data from State and local programs is uneven and difficult to collect, resulting in significant time lags. Even with time lags, however, the available data provide a rough proxy for the leveraging effect of the MBNQA on State-level programs.
Actions to be taken BNQP uses other methods to assess the program's relevance and utility, such as occasional executive surveys and review of anecdotal evidence. Timeliness of data generated by State and local quality programs is difficult to influence.

Performance Goal 4:
Promote Performance and Quality Management

Measure 4.b:
Number of Baldridge Criteria mailed by the BNQP and Baldridge-based State and local quality programs



Data Validation and Verification:

Data collection Application data are collected and tracked by the Baldrige National Quality Program.
Frequency Based on the application cycle. Data from State and local programs is collected annually.
Data storage Baldrige National Quality Program.
Verification Data represent direct and verifiable counts of BNQP information dissemination. Internal verification includes review by the Director's Office.
Data limitations The data are partial representation of BNQP's output. The number of documents mailed does not capture additional dissemination channels, such as electronic acquisition and dissemination; reproduction of the Baldrige *Criteria* in textbooks, articles, and other documents; and secondary modes of copying and distribution. Moreover, direct counts of BNQP *Criteria* do not capture various formal and informal ways in which BNQP concepts can be disseminated, such as through academic programs, consulting channels, business and organizational management literature, etc. Data from State and local programs is uneven and difficult to collect, resulting in significant time lags. Even with time lags, however, the available data provide a rough proxy for the leveraging effect of the MBNQA on State and local programs.
Actions to be taken: BNQP uses other methods to assess the program's relevance and utility, such as occasional executive surveys and review of anecdotal evidence. Timeliness of data generated by State quality programs is difficult to influence.

Program Evaluation Efforts

Independent expert review of all aspects of the BNQP's plans and operations is provided by the Board of Overseers, a prestigious group of national quality experts from business and academia. The Board of Overseers serves as a Federal advisory panel to the Secretary of Commerce, and it is the Board's responsibility is to assess how well the BNQP is serving the national interest. The Board reviews all aspects of the BNQP, including the adequacy of the Evaluation Criteria and processes for making Baldrige Awards, and reports its recommendations to the Secretary.

Other annual external program evaluations are provided by the Panel of Judges and the Foundation for the Malcolm Baldrige National Quality Award. Moreover, the House Committee on Science, Space and Technology conducts occasional oversight hearings involving winners of the award, NIST, and outside experts to review the Program's effectiveness and management issues.

Performance Goal 4:
Promote Performance and Quality Management

Objectives and Strategies

Objectives	Strategies
Develop and continuously improve the Malcolm Baldridge National Quality Award, broadly disseminate criteria for evaluating performance, and promote quality awareness and performance excellence.	· Successfully implement the new award programs for the education and health care sectors, and explore the possibility of an award category for other non-profit organizations. · Prepare educational materials (such as case studies) and acquire the capacity to conduct research and generate documents that will: 1) identify best practices and articulate the underlying principles of leading management practices and performance evaluation techniques; and/or 2) help businesses and other organizations initiate and sustain performance improvement strategies.
Promote quality awareness and business excellence practices of small service businesses and manufacturers.	· Use flexible partnerships to reach and address the needs of smaller firms. · Lead an expanding national system of state and local quality programs. · Prepare educational materials designed to help businesses and other organizations initiate and sustain performance improvement strategies.

Resource Requirements

Total Dollars: $5.2 million - direct, $1.6 million - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$3.9 M	$2.4 M	$4.9 M	$1.6 M	$5.2 M	$1.6 M

Total FTEs: 40
BNQP professional staff consists of 13% Ph.D., 50% MA/MS, 25% BA/BS

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
39	0	40	0	40	0

Total IT Budget: $0.6 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$0.5 M	$0.6 M	$0.6 M

Performance Goal 4:
Promote Performance and Quality Management

Cross-Cutting Issues

Other Government Agencies

The BNQP provides OPM with Baldrige Criteria, Processes, and Baldrige Examiner Board members for the Presidential Quality Award.

External Factors and Mitigation Strategies

BNQP's ability to further promote quality awareness and performance excellence will depend in part upon acquiring the formal authority to conduct research, develop data on best practices, and generate self-assessment primers and other educational materials.

Performance Goal 5: Protect the National Information Infrastructure

Rationale for Performance Goal

The ubiquitous and interconnected nature of IT increases the extent to which even limited attacks or failures can broadly disrupt the Nation's information infrastructure. The U.S. economy and society now depend broadly upon computers and networks, and the reliability, security, and quality of those systems must be strengthened. The potential negative consequences of inadequate assurance accumulate as IT systems expand and often are not apparent until major systems fail. Without adequate assurance, the viability of the entire information infrastructure—and therefore the entire U.S. economy—is put at risk.

The goal of this program is to increase the security, reliability, and survivability of the information technology systems and networks that comprise the Nation's information infrastructure. This goal will be pursued through the establishment and operation of the Institute for Information Infrastructure Protection (IIIP), headquartered at NIST, which will lead a partnership among industry, academia, and government to develop the R&D capacity, technologies, and knowledge needed to protect the Nation's critical information infrastructure. Vulnerabilities affecting the information and communications infrastructure can potentially affect the entire U.S. economy, not just a single sector or industry. Consequently, there is a substantial need for significant new research into advanced technologies, measurements, and methods that can raise the level of reliability and security of critical information technology-based systems and networks. The IIIP will build this R&D capacity by providing research grants to universities, industry and government to build appropriate R&D expertise. This work supports Presidential Decision Directive (PDD) #63, dated May 22, 1998, as well as the DoC Secretarial priority on Establishing Safeguards Against Unconventional National Security Threats.

Measure 5.a: Activity metrics related to program establishment

Evaluating the IIIP's performance ultimately will require the development of outcome measures that gauge the security, reliability, quality, and survivability of information technology systems and networks. Appropriate measures would indicate the degree to which technologies generated and disseminated through the IIIP have reduced IT system malfunctions and/or enhanced the reliability of service delivery, the security of information storage and transfer, and the quality of service content. Comprehensive outcome measures of this nature likely will be difficult to develop, and undoubtedly will apply only after the IIIP has been in operation long enough for its R&D outputs to generate measurable aggregate impacts. As the IIIP becomes established, it will build appropriate outcome measures into its long-term program and operational plans.

Data Validation and Verification:

Data collection TBD.
Frequency TBD.
Data storage TBD.
Verification TBD.
Data limitations. TBD.
Actions to be taken. The IIIP will build output and ultimately outcome evaluation into its program plans and operations. The IIIP's Advisory and Oversight committees will be used to provide guidance toward long-term programmatic goals.

In the formative stages of the IIIP, the program will be evaluated through the timely and successful completion of appropriate activities, such as developing an operations plan, hiring staff, establishing advisory and oversight committees, establishing grant selection boards, and providing grant services. In later phases, the program will be evaluated through the production of core R&D outputs that support the Nation's critical information infrastructure: advanced technologies and solutions, tools, standards, and tests. In addition, the Institute's central objective—increasing the Nation's R&D capacity for information infrastructure protection—will be gauged through the provision of R&D grants and the coordination of industry, university, and academic efforts. The IIIP's Oversight Committee will likely provide the best source of information on progress toward this particular objective.

Performance Goal 5:
Protect the National Information Infrastructure

Program Evaluation Efforts

N/A

Objectives and Strategies

Objectives	Strategies
Increase the Nation's R&D capacity for information infrastructure protection.	- Provide research grants to universities, industry, and government to build appropriate R&D expertise

Resource Requirements

Total Dollars: $50.0 million

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
N/A	N/A	N/A	N/A	$50.0 M	0

Total FTEs: 12

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
N/A	N/A	N/A	N/A	12	0

Total IT Budget: TBD

FY 99 Actual	FY 00 Enacted	FY 01 Request
N/A	N/A	TBD

Performance Goal 5: Protect the National Information Infrastructure

Cross-Cutting Issues

N/A

External Factors and Mitigation Strategies

Three major external factors are most likely to affect the IIIP's progress toward its programmatic goals: 1) the technical uncertainty that is intrinsic to the R&D enterprise; 2) the scope of the technologies involved and the pace of technological change; and 3) the dynamics of evolving domestic and international markets. There are no real mitigating strategies for the first factor, other than supporting R&D by the best available people and organizations. To mitigate the effects of the second and third factors, the IIIP will rely on the breadth and technical expertise of a Critical Infrastructure Protection Advisory Committee. The Advisory Committee will comprise up to 35 representatives from the information technology industry, government (e.g., CIP lead sector agencies, Critical Information Assurance Office, and special function coordinators), academia, and private sector owners/operators of critical infrastructure systems (e.g., through Information Sharing and Analysis Centers and other industry alliances). In addition, an Oversight Committee, comprising DoD, GSA, FBI, DoJ, NIST, NSA, DARPA, OSTP, NSC, OMB and other appropriate Federal organizations, will be used to set the IIIP's long term strategic direction.

Performance Goal 6:
Analyze and Develop Technology Policies

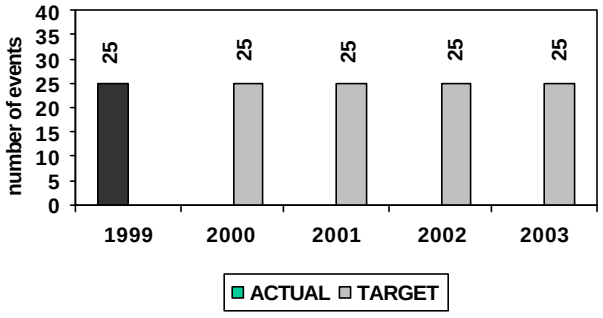
Rationale for Performance Goal

Technological innovation and industrial competitiveness depend upon a supportive policy environment to overcome market inefficiencies in innovation, investment, and competition. To this end, US/OTP coordinates and leads several Presidential Initiatives designed to recognize and promote technological achievement (the National Medal of Technology), generate new technologies with high potential for socio-economic advancements (Partnership for a New Generation of Vehicles-PNGV), and improve the conditions for international technology cooperation (U.S.-Israel Science and Technology Commission-USISTC). In addition, US/OTP works closely with the States to manage and improve complex policies that affect innovation, such as regulatory policies that influence innovation in telemedicine, environmental technologies, building and construction, and other areas.

More generally, US/OTP promotes science and technology policy development and advocacy through analyses of competition in technology-oriented industries; the impact of various regulatory, tax, legal, and other public policies on corporate behavior; and the foreign policy and competitive context in overseas markets. In all of its activities, US/OTP seeks to coordinate Federal and State policy efforts in ways that support a truly national approach to science and technology policy.

US/OTP evaluates its performance and plans its work through several evaluation mechanisms: extensive and ongoing consultation with public and private sector stakeholders, selected peer review, and output tracking. These sources of performance evaluation provide diverse and useful information for managing US/OTP's policy development, coordination, and analysis roles. However, no single output measure can capture US/OTP's diverse activities. Moreover, US/OTP's core functions—providing policy advice and influencing the policymaking process—are difficult to characterize quantitatively. Policy analyses and advocacy efforts seek to influence the attitudes and positions of key parties, while actual policy outcomes are determined by multiple institutional, organizational, economic and political factors. For this reason, US/OTP uses activity and output metrics to characterize the program's overall annual performance, such as the number of roundtables, seminars, negotiations and other meetings held with industry, government and academia to advance TA policy goals

Measure 6.a:
Number of roundtables, seminars, negotiations and other meetings held with industry, government and academia to advance TA policy goals



Data Validation and Verification:

Data collection US/OTP.
Frequency US/OTP performance data cumulate throughout the year and are reported annually.
Data storage US/OTP.
Verification Data represent verifiable tabulations of US/OTP activities.
Data limitations. Data represent a partial indicator of US/OTP work, as described above.
Actions to be taken Tabulations and descriptions of additional program activities can be provided.

Performance Goal 6: Analyze and Develop Technology Policies

Program Evaluation Efforts

US/OTP has not conducted a formal program evaluation in FY 1999, in light of two facts: the intrinsic difficulty of measuring the efficacy of policy advisory functions; and the high cost of formal program evaluation relative to US/OTP's size.

Objectives and Strategies

Objectives	Strategies
Coordinate and lead key interagency technology programs.	-- Recognize and promote technological achievement (the National Medal of Technology). -- Generate new technologies with high potential for socio-economic advancements (PNGV). -- Improve the conditions for international technology cooperation (USISTC).
Coordinate and lead interagency efforts to strengthen technology partnerships between States and the Federal government.	-- Develop and coordinate the U.S. Innovation Partnership to improve how state and federal R&D agencies manage complex policies that affect innovation, such as regulatory policies that influence innovation in telemedicine, environmental technologies, building and construction, and other areas. -- Develop and administer the EPSCoT program to improve the infrastructure and general business conditions for technology-led economic growth in particular regions of the United States.
Improve the information base for science and technology policy.	-- Generate reports and analyses of foreign technology policies and domestic industrial and technological trends, including but not limited to: competition in technology-oriented industries; the impact of various regulatory, tax, legal, and other public policies on corporate behavior; and the foreign policy and competitive context in overseas markets.

Resource Requirements

Total Dollars: $8.7 million - direct, $0.6 million - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$10.8 M	$0.1 M	$7.9 M	$0.6 M	$8.7 M	$0.6 M

Performance Goal 6:
Analyze and Develop Technology Policies

Resource Requirements, cont..

Total FTEs: 50 - direct, 1 - reimbursable

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
43	1	50	1	50	1

Total IT Dollars: $0.2 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
$0.2 M	$0.2 M	$0.2 M

Cross-Cutting Issues

Other Government Agencies

Through the Committee on Technology of the President's National Science and Technology Council, the Under Secretary helps to establish clear national goals for Federal science and technology investments and to ensure that Federal civilian R&D priorities reflect the requirements of industry customers. The Committee currently is coordinating several major Administration R&D initiatives in materials, construction and building, manufacturing infrastructure, electronics and automotive technologies.

External Factors and Mitigation Strategies

Outputs associated with coordination and leadership functions depend in part upon the interest and commitment of numerous public and private sector participants operating at the State and Federal levels. US/OTP can influence but not control other participants.

Performance Goal 7:
Collect, organize, preserve, and disseminate government scientific, technical, and business-related information

Rationale for Performance Goal

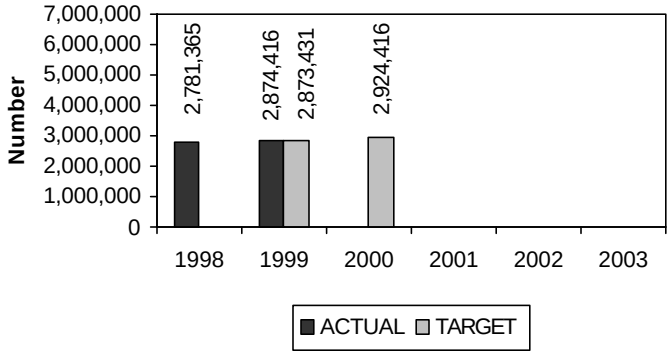
The National Technical Information Service (NTIS) operates a central clearinghouse of scientific and technical information which is useful to American business and industry. NTIS is directed to collect scientific and technical information; catalog, abstract and index the information, permanently archive the information and disseminate products in the forms and formats most useful to its customers; develop electronic and other new methods and media to disseminate information; provide information processing services to other Federal agencies; and charge fees for its products and services that permit NTIS to recover its costs.

NTIS contributes directly to the Department's effort to provide U.S. industry and the Nation with a world-class scientific and technical information base. NTIS' output directly enhances the Nation's scientific and technical information base, which in turn supports virtually all segments of the Nation's scientific and technological enterprise.

NTIS collects its information material primarily from U.S. Government agencies and their contractors and grantees, as well as from international, primarily governmental, sources. The NTIS collection includes almost 3 million titles – reports describing the results of Federally sponsored research; statistical and business information; audiovisual products; computer software and electronic databases developed by Federal agencies; and reports prepared by foreign research organizations. NTIS maintains a permanent repository of its information products and offers copies of this material to its many customers, largely researchers and business managers in private industry. The disseminated materials may include computer downloads or paper, microfiche, audiovisual or electronic media.

Overall, dissemination metrics adequately convey NTIS' performance relative to its statutory responsibilities. However, they do not comprehensively represent NTIS' output and performance (for instance, NTIS also assists agencies in the production and dissemination of their information). Moreover, these measures do not convey the impact of all of NTIS' services.

Measure 7.a:
Number of items in archive

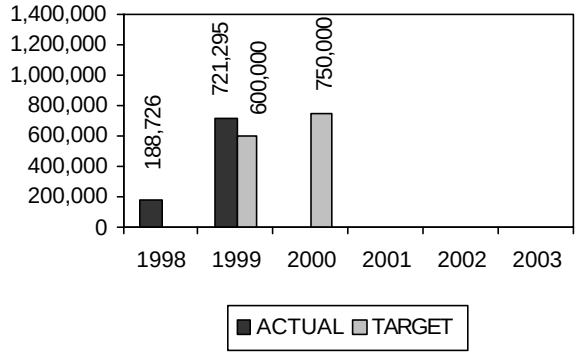


Data Validation and Verification:

Data collection NTIS operates and maintains internal systems for processing collected information into available products. NTIS records every transaction using a commercial order processing system modified to meet its specific needs.
Frequency Internal management activity reports are produced daily, with monthly summaries..
Data storage All performance-related information is stored within the NTIS order processing system.
Verification NTIS accounting and budget offices analyze and report performance output data and revenue and cost data to management. Data verification is provided through regular internal and independent auditor reporting.
Data limitations Data represent only a partial measure of NTIS outputs. Data do not capture quality or impact of NTIS services
Actions to be taken None warranted.

Performance Goal 7:
Collect, organize, preserve, and disseminate government scientific, technical, and business-related information

Measure 7.b:
Number of documents reproduced from electronic media



Data Validation and Verification:

See section above regarding the number of items in the archive.

Program Evaluation Efforts

Legislation has been proposed to Congress that would cease operations of the National Technical Information Service by the end of FY 2000 and would transfer the NTIS collection of scientific and technical information to the Library of Congress, effective October 1, 2000.

Objectives and Strategies

Objectives	Strategies
Play a leadership role in assisting Federal agencies with dissemination of their scientific, technical, and business information.	-Leverage NTIS experience with information dissemination . -Leverage NTIS joint venture authority to broaden distribution.
Provide services and infrastructure to control scientific, technical, and business-related information, and increase the effectiveness of systems for locating and delivering information in the form required by customers.	- Leverage NTIS investment in production technologies. - Leverage NTIS core capabilities for information management. - Leverage NTIS sales and distributor channels. - Develop information products and services for agencies.

Performance Goal 7:
Collect, organize, preserve, and disseminate government scientific, technical, and business-related information

Resource Requirements

Total Dollars: $0.0

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct obligations	Reimbursable	Direct appropriations	Reimbursable	Direct appropriations	Reimbursable
$1.1 M	$32.2 M	$0.0 M	$40.0 M	0	0

Total FTEs: 0

FY 99 Actual		FY 00 Enacted		FY 01 Request	
Direct	Reimbursable	Direct	Reimbursable	Direct	Reimbursable
0	322	0	260	0	0

Total IT Budget: $0.0 million

FY 99 Actual	FY 00 Enacted	FY 01 Request
N/A	N/A	0

Cross-Cutting Issues

NTIS provides a variety of services that assist other agencies in developing, producing, and disseminating their information.

External Factors and Mitigation Strategies

Legislation has been proposed to Congress that would cease operations of the National Technical Information Service by the end of FY 2000 and would transfer the NTIS collection of scientific and technical information to the Library of Congress, effective October 1, 2000.